

# SOUTHEASTERN BIOLOGY



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**ASB 70<sup>TH</sup> ANNUAL MEETING**

*ASB*

**APRIL 1-4, 2009**

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The University of Alabama  
Birmingham, Alabama, and  
Jacksonville State University  
Jacksonville, Alabama

*ASB*

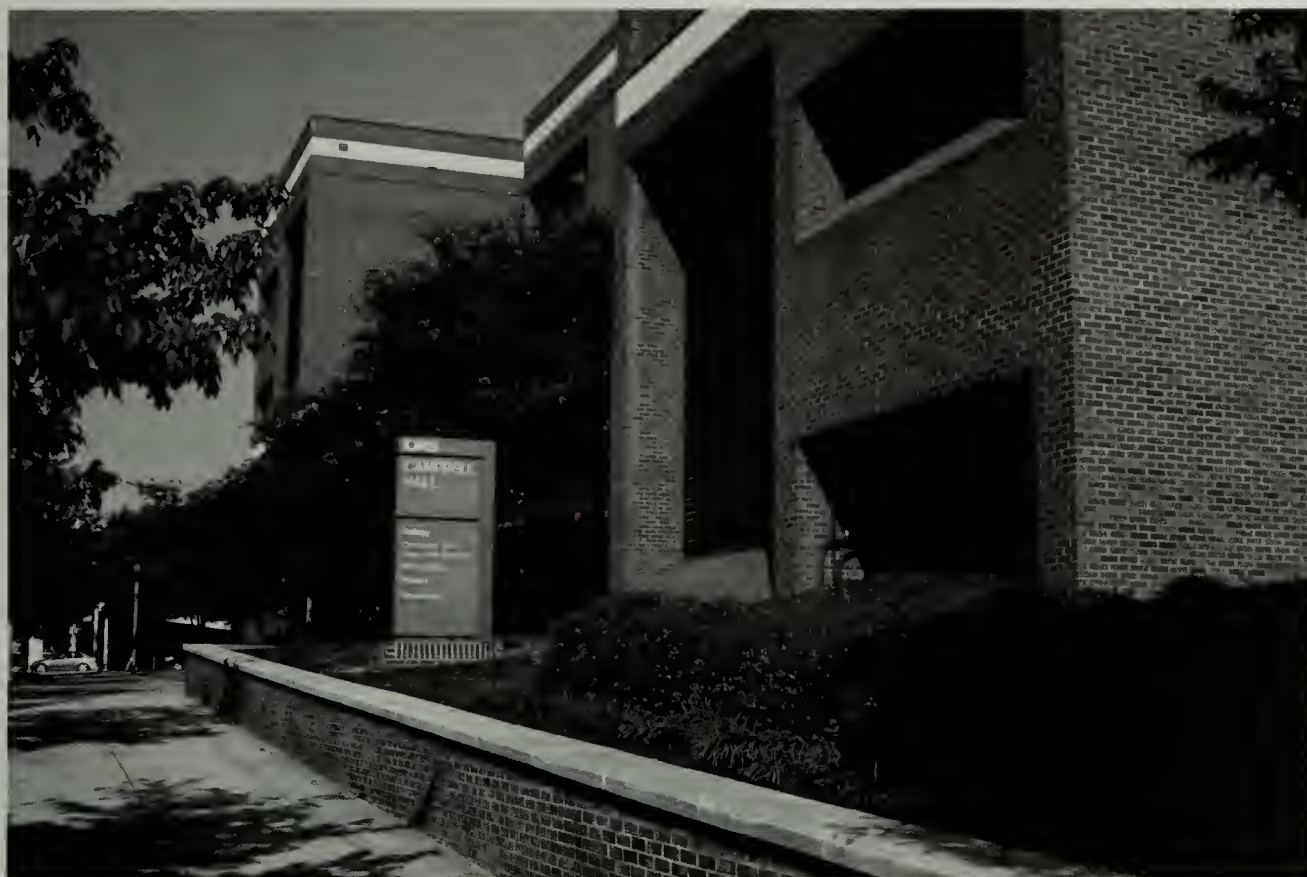
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See Page 1 and Consult Website  
<http://www.asb.appstate.edu/>

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Campbell Hall where the Biology Department is housed at the  
University of Alabama, Birmingham

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*The Official Publication of*  
*The Association of Southeastern Biologists*  
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## **SOUTHEASTERN BIOLOGY**

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### **PURPOSE**

The purpose of this association shall be to promote the advancement of biology as a science by encouraging research, the imparting of knowledge, the application of knowledge to the solution of biological problems, and the preservation of biological resources. The ASB has representation in Section G Committee of the AAAS. Varying types of membership are available to individuals and institutions. See inside back cover.

### **TIME AND PLACE OF FUTURE MEETINGS**

2009 April 1-4: Co-hosted by Jacksonville State University, Jacksonville, Alabama, and University of Alabama, Birmingham, Alabama. Meeting site is the Sheraton Birmingham Hotel, Birmingham, Alabama.  
2010 April 7-10: Co-hosted by Western Carolina University, Cullowhee, North Carolina, and its Southern Appalachian Biodiversity and Ecology Center, and the University of North Carolina, Asheville, North Carolina. Meeting site is the Crowne Plaza Hotel, Asheville, North Carolina.

**The University of Alabama at Birmingham, AL  
and  
Jacksonville State University, Jacksonville, AL  
are proud to host the**



**70<sup>th</sup> Annual Meeting of the  
Association of Southeastern Biologists  
April 1 – 4, 2009, Birmingham, AL  
Sheraton Birmingham Hotel**

This four-day event brings together approximately 800 biologists from across the southeastern United States. The meeting features a distinguished plenary speaker, special symposia, field trips, oral and poster presentations, workshops, networking and social events, and more.

The Annual Meeting provides you with the exclusive opportunity to showcase your products and/or services to this large and important audience of faculty, students, researchers, conservation workers, military and government personnel, and business professionals with a common interest in biological issues. Interests are diverse, and range from genetics and molecular biology, to physiology and population biology, to community and ecosystem ecology and systematics.

**About ASB:** The Association of Southeastern Biologists (ASB) was established in 1937 by biologists concerned with the quality of biological research in the southeastern United States. Today, ASB is the largest regional biology association in the country, and is committed to the advancement of biology as a science by the promotion of science education, research, and the application of scientific knowledge to human problems.

**ASB Web Site:** Many thanks to Dr. Dennis Haney, Furman University for maintaining ASB's web site. Please visit our new and exciting web site: [www.asb.appstate.edu](http://www.asb.appstate.edu). Many new features have been added, register on-line for our Annual Meeting, view photos, inquire about career opportunities and more.

## **The University of Alabama at Birmingham (UAB)**

The University of Alabama at Birmingham grew out of the establishment of the University of Alabama School of Medicine and the associated University Hospital during the early portions of the Twentieth Century. Undergraduate education began in the mid-1930's as an extension center of the University of Alabama. UAB became an autonomous campus and degree-granting university in 1969. In the four decades since, this young, dynamic institution has driven the social, cultural and economic revival of Birmingham and has evolved into a world-renowned research center and medical center.

Today, UAB attracts the best and brightest students from around Alabama, the nation and some 105 countries around the globe. UAB's total enrollment is now over 16,000 students. More than 4,700 of this number are enrolled in graduate programs and approximately 1,000 are students in the health professional programs (medicine, dental, optometry and related areas). Thirty-six programs award the doctoral degree. In funding from the National Institutes of Health (NIH), UAB ranks 20<sup>th</sup> nationally, and five medical specialties within the UAB School of Medicine are ranked in the top 20 by U.S. News and World Report. The Carnegie Foundation places UAB in the top 95 comprehensive research universities, public and private. UAB is also Alabama's largest employer, with more than 18,000 faculty and staff in the academic and health systems.

In recent years, the undergraduate campus area has expanded and has been redesigned to take on a more traditional campus appearance. This has mirrored the change in the composition of the student body over the years. Originally mostly commuters, now almost 60% of undergraduates are from other areas of Alabama, the nation, and the world.

## **Jacksonville State University, Jacksonville, AL (JSU)**

In 1883, the Alabama Legislature passed a bill to create a state normal school in northeastern Alabama. Beginning with 3 faculty, the school initially enrolled 25 students. Faculty also taught 222 children from Jacksonville and the surrounding area in a preparatory school as part of their original mandate. It became a State Teacher's College in 1930, reflecting its increasing role in teacher education within the state. In 1957, it offered its first master's degree program (elementary education), thus becoming Jacksonville State College. In 1966, the Legislature awarded the institution university status, becoming Jacksonville State University. From its humble beginnings with 25 students, JSU now enrolls over 9,400 students in 45 undergraduate and 24 graduate programs. The University's commitment to teacher education remains high: JSU produces more public school teachers than any other college/university in Alabama.

The Biology Department has 13 faculty mentoring nearly 400 students in their BA, BS, and MS programs. Student/faculty research is encouraged and they have presented their research at local, state, national, and international professional meetings. Faculty teaching and research expertise includes aquatic/field/wetland ecology, meiobenthology, amphibian bioacoustics, conser-

vation biology, ecotoxicology, phytoremediation, physiological ecology, microbial ecology of microbe-host interactions, molecular genetics, microbiology, and plant & animal systematics. These activities are supported by laboratory facilities and equipment appropriate for field research (including three research boats, sound analysis software, & an electroshocker), molecular genetics (including an automated capillary array gene sequencer and real-time PCR), an image analysis center (including an SEM, research grade compound microscope, and analytical software), macro & micro-respirometry systems, environmental chambers, Chemical analysis (AA, GC, LICOR system, water quality probe), a wetlab for ecotoxicology testing, and greenhouse/aquaculture facilities. Faculty have received research/teaching grants from NSF, NIH, USFWS, NOAA/NMFS, NASA, USDA/NFS, and the Eisenhower program. The Department maintains active partnerships with USFWS, USDA/NFS, USNPS, and NOAA/NMFS.

### ***Birmingham, Alabama***

The Birmingham metropolitan area has an aggregate population well over 1 million people. Nestled in the foothills of the Appalachians, the city is laid out in a series of lush rolling hills and valleys, with woodland-covered neighborhoods just minutes from downtown. The “Magic City” has a distinct southern character and tradition and especially when it comes to food and dining. It is noted for different flavors of barbeque, but also has some nationally-acclaimed gourmet restaurants, as well. Birmingham is also well known as one of the major medical centers in North America, primarily anchored by the Medical Center at the University of Alabama at Birmingham (UAB). In addition to the availability of undergraduate collegiate studies at UAB, Birmingham is also home to Samford University and Birmingham Southern College. The mild winters and ready access to nearby lakes, rivers and natural areas makes Birmingham an ideal location for those interested in a variety of outdoor activities.

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## **ASB-2009 Tentative Schedule**

### **DAY/TIME**

### **EVENT**

#### **Wednesday, April 1**

8:00 am-8:00 pm	Registration Open
8:00 am-8:00 pm	Cyber Café Open
9:00 am-4:00 pm	Exhibitor Move-In
12 noon-2 pm	Exhibitor Pizza Party (Exhibitors Only)
1:30-5:30 pm	ASB Executive Committee Meeting
1:30-5:30 pm	SABS Council Meeting
2:00-5:00 pm	SSP Executive Committee Meeting
5:30-7:30 pm	SSP Presidential Symposium
7:30-9:00 pm	ASB Plenary Session: Dr. Andrew Berry– “Darwin’s Third Century: A Return to Natural History” East Meeting Room M
9:00-10:30 pm	Welcome Reception with light hors d'oeuvres – East Ballroom

#### **Thursday, April 2**

7:00 am-5:00 pm	Power Point Preview & Technology Check
7:00-8:30 am	ASB Past Presidents' Breakfast
8:00 am-5:00 pm	Exhibits Open
8:00 am-5:00 pm	Registration Open
8:00-9:00 am	ASB Posters I: Setup
8:10-12:10 pm	Symposium I – “Biodiversity Informatics: Progress and Potential in the Southeastern USA”
8:15-10:00 am	Paper Presentations
9:00 am-4:00 pm	ASB Posters I: On Exhibit
10:00-11:00 am	ASB Posters I: Presenters (odd numbered posters) must be present
10:00-10:30 am	Break: Visit Exhibits & Posters
10:30-12:00 pm	Paper Presentations
12:00-1:30 pm	Lunch (Individuals & Organizations)
12:00-1:30 pm	Education Committee Luncheon and Workshop: “Teaching Evolution in the Biology Classroom: Strategies and Challenges”
12:00-1:30 pm	SWS South Atlantic Chapter Luncheon
1:00-5:00 pm	Tri-Beta Field Trip to the McWane Center
1:30-3:00 pm	Paper Presentations
2:30-4:30 pm	Human Diversity Workshop: “Graduate School Preparation: The What? Why? Where?”
2:30-3:30 pm	ASB Posters I: Presenters (even numbered posters) must be present
3:00-3:30 pm	Break: Visit Exhibits & Posters
3:30-5:15 pm	Paper Presentations
4:00-5:00 pm	ASB Posters I: Poster Removal
6:00-11:00 pm	Thursday Night Social

**Friday, April 3**

7:00 am-4:00 pm	Power Point Preview and Technology Check
7:00-8:30 am	SABS/BSA Breakfast
7:30-8:30 am	ASB Patrons and Exhibitors Breakfast
7:30-8:45 am	βββ Poster Setup
7:30-9:00 am	
8:00-9:00 am	ASB Posters II: Setup
8:00 am-2:00 pm	Exhibits Open
8:15-10:00 am	Paper Presentations
8:30-9:00 am	βββ Officers Meeting
9:00-10:00 am	βββ Judges Meeting
9:00 am-4:00 pm	ASB Posters II: On Exhibit
9:00-10:00 am	SHC Executive Board Meeting
10:00-11:00 am	βββ Business Meeting
10:00 am-12:00 pm	βββ Poster Presentations
10:00-11:00 am	ASB Posters II: Presenters (odd numbered posters) must be present
10:00-10:30 am	Break: Visit Exhibits & Posters
10:30-11:15 am	Paper Presentations
11:15 am-12:15 pm	<b>ASB Business Meeting</b>
12:15-1:45 pm	Lunch (Individuals & Organizations)
12:15-1:00 pm	ESA/SE Luncheon
2:00-4:00 pm	Exhibitor Move-Out
1:45-4:45 pm	
1:45-4:45 pm	Symposium II: "2009 ASB Darwin Bicentennial Symposium: Natural Selection – Past Present and Future"
2:30-3:30 pm	ASB Posters II: Presenters (even numbered posters) must be present
3:00-3:30 pm	Break: Visit Exhibits & Posters
3:30-4:00 pm	ASB Posters II: Poster Removal
5:30-6:00 pm	SHC Business Meeting
6:00-7:00 pm	Friday Night Social
7:00-10:00 pm	Awards' Banquet: Presentation and Announcement of Awards

**Saturday, April 4**

7:30-11:30 am	ASB Executive Committee Breakfast Meeting
9:00 am- 1:00 pm	Field Trips (Listed in this issue)
8:30 am- 4:30 pm	Curator's Workshop

**PLENARY SPEAKER****DR. ANDREW BERRY**

Museum of Comparative Zoology--Harvard University

***Darwin's Third Century: A Return to Natural History***

With an undergraduate degree in zoology from Oxford and a PhD in evolutionary genetics from Princeton, Dr. Berry's expertise is on how Darwinian processes affect natural populations. His research has taken him into the bowels of molecular biology labs (in pursuit of that most charismatic of species, the fruit fly) and to more far-flung locales, such as Nepal (bats), Borneo (butterflies), the Ecuadorean Andes (more butterflies), and the Faroe Islands (wrens). In the highlands of New Guinea, he has done research on the ecology and behavior on some of the region's more engaging species: giant rats and spiny bandicoots. Currently a research associate at the Museum of Comparative Zoology, he teaches both at Harvard and overseas (including recent courses on molecular biology in Antananarivo, Madagascar; on evolution in Istanbul, Turkey; and on the history of science in Oxford). Dr. Berry is a popular writer as well as speaker for both scientific and popular audiences. His book on Alfred Russel Wallace, *Infinite Tropics* (2002), surveys the remarkable achievements of the unjustly neglected co-discoverer of natural selection and in 2003, he co-authored with James D. Watson to write *DNA*. The publication was written to mark the fiftieth anniversary of the discovery of the DNA double helix and tells the story of the ongoing scientific, technological, and social revolution precipitated by the breakthrough. He and his wife, Harvard lepidopterist Naomi Pierce, live in Cambridge MA with their twin 11-year-old daughters.

We welcome Dr. Berry to the 70<sup>th</sup> Annual Meeting of the Association of Southeastern Biologists!



**DR. ANDREW BERRY**



## Hotel Information

2009 Association of Southeastern Biologists  
April 1-4, 2009, Birmingham, AL  
Sheraton Birmingham & the BJCC

**Please use the ASB approved hotel, ASB will receive exclusive benefits for using the ASB sponsored hotel. Experience comfortable convenience! Park your car at the Sheraton and leave it until the end of the convention.**

ASB has secured the following hotel at a discounted rate for exhibitors and attendees. Please remember to ask for the special **ASB discounted rate when making reservations or use the assigned ASB link.** The following hotel is providing additional services to accommodate ASB. Please make your reservations as soon as possible. The Sheraton Birmingham is our Headquarters Hotel and has been secured for Exhibitors and ASB attendees. There is a daily parking fee at the Sheraton Birmingham for personal vehicles and vans. Please make your reservations as soon as possible. Please visit their web sites for directions to their property. **THE LAST DAY TO RESERVE A ROOM AT THE DISCOUNTED RATE IS 3/01/09.**

### **About the hotel**

Warm and inviting as the southern sun, Sheraton Birmingham Hotel is in the heart of Birmingham's central business district. Connect with colleagues in one of Alabama's largest and most recognized convention hotels. Events of various sizes will thrive in over 350,000 square feet of meeting and exhibition space, including Alabama's largest ballroom—25,000 square feet of elegant and versatile space. We are also conveniently connected to the Birmingham/Jefferson Convention Complex by a covered skyway. Discover southern hospitality at its best. Enjoy some of the finest restaurants in the south in the nearby Five Points South entertainment district. Join in the excitement of fellow fans at the infamous Alabama Sports Hall of Fame. At day's end, relax in our indoor pool or unwind at Casey's Sports Bar & Grill. The minor stresses of travel are soothed away in our comfortable guest rooms and suites, complete with the signature Sheraton Sweet Sleeper (SM) Bed. Experience Birmingham in a way you'll never forget at the Sheraton Birmingham Hotel.



## **2009 ASB Group Discount Hotel**

### **Headquarters Hotel**

#### **Sheraton Birmingham**

2101 Richard Arrington Jr Blvd, North  
Birmingham, AL, 35203

[www.Sheraton.com/Birmingham](http://www.Sheraton.com/Birmingham)  
phone: 205-324-5000

#### **1) Attendees (Non-Student). Rates & Link (To Register Online see below)**

Single-\$129.00	Triple-\$149.00
Double-\$139.00	Quad \$159.00

Use the following link (copy and paste into your browser) to reserve your room online or you may call the hotel directly. If you call to make your reservation, please tell them to make your reservation with the Association of Southeastern Biologists to receive the discounted rate!

Link for Exhibitors and Attendees (Non-Student):

<http://www.starwoodmeeting.com/Book/sebiologist>

#### **2) Students Only. Rates & Link (To Register Online see below)**

***A Limited Number of Rooms Available for Students Only at the Special Rate Below. These Rooms are a First-Come, First-Served Basis Only. You must present Student ID at check-in !***

Single-\$99.00	Triple-\$119.00
Double-\$109.00	Quad \$129.00

Use the following link (copy and paste into your browser) to reserve your room online or you may call the hotel directly. If you call to make your reservation, please tell them to make your reservation with the Assn of Southeastern Biologists to receive the discounted rate!

Link for Students Only:

<http://www.starwoodmeeting.com/Book/biologystudent>

### ***Travel to the Sheraton Birmingham***

**From Atlanta via I-20 West.** Continue west on I-20 until the merger with I-59 near the Birmingham International Airport. Go past the exit to the Airport (Airport Highway) on I20/59 and exit at 22<sup>nd</sup> Street. Go through the intersection to the stoplight. Turn right at the light and the hotel entrance is one block further on the right.

**From Chattanooga via I-59 South.** Continue on I-59 in a general southwest direction until the merger with I-20 near the Birmingham International Airport. Go past the exit to the Airport (Airport Highway) on I20/59 and exit at 22<sup>nd</sup> Street. Go through the intersection to the stoplight. Turn right at the light and the hotel entrance is one block further on the right.

**From Nashville via I-65 South.** Take I-65 South to Exit 261A. You will then be on I-20/59 for less than half a mile. Then take Exit 125B, which is 22<sup>nd</sup> Street. Turn left at the second stoplight and left again on 9<sup>th</sup> Avenue North. Continue straight ahead and the hotel entrance is on the right.

**From Tuscaloosa via I-20 East/I-59 North.** Continue past the junction with I-65 and take Exit 125B, which is 22<sup>nd</sup> Street. Turn left at the second stoplight and left again on 9<sup>th</sup> Avenue North. Continue straight ahead and the hotel entrance is on the right.

**From Montgomery via I-65 North.** Take I-65 North to Exit 261A. You will then be on I-20/59 for less than half a mile. Take Exit 125B, which is 22<sup>nd</sup> Street. Turn left at the second stoplight and left again on 9<sup>th</sup> Avenue North. Continue straight ahead and the hotel entrance is on the right.

### ***ASB 2009 Field Trips***

In its overall diversity of its plant and animal life, Alabama is rivaled by few other areas of comparable size in the United States. A remarkable geological and physiographic variability is the major reason for the state's richness in biodiversity. The Fall Line roughly bisects the state in half, resulting in a hilly to mountainous terrain with numerous bluffs and rock outcrops in the northern regions, and a series of lower elevation and flatter coastal plain habitats in loamy to sandy soils in the south. A small coastal shoreline with large areas of marsh and many river systems spread throughout the state also add to the diversity of species. A series of field trips has been planned to observe aspects of this richness of life.

Most trips are a half-day in length in order to expedite your trip home. Trips will involve caravans and carpooling, where possible, will be encouraged. Most trips are within a half-hour drive or less from the Sheraton. "One-way" participation, that is, without a return to the Sheraton, is OK. Lunch or snacks will be on your own; bring whatever food and water you will need.

Early April in Alabama is a time of explosive leafing and flowering of plants. However, the weather at this time of the year can be highly variable. This is also often a time when rain events can be common. Thus, participants should come prepared (including proper footwear) for a wide variety of conditions. Most field trips may involve potential wet or muddy places. For information, contact field trip coordinators Chris Murdock or Larry Davenport.

### ***ASB 2009 Field Trip Options***

1. **Botanical Diversity Field Trip**, *Jefferson and Shelby Counties, AL*. 8:00 a.m. - 12:00 p.m. Trip Leader; Larry Davenport, Samford University. Seasonal wildflowers and woodland plants of Central Alabama. Locations will be within a half-hour drive from the Sheraton. Maximum of 20 participants.
2. **Birmingham Botanical Gardens**, 8:00 a.m. – 12:00 p.m. Trip Leader: Dan Jones, UAB. A tour of the gardens. Unusual collections will be highlighted. A ten-minute drive from the Sheraton. Maximum of 20 participants.
3. **Birding/Salamander Field Trip**, *Ruffner Mountain Nature Center, Birmingham*. 8:00 a.m. – 12:00 p.m. Trip leaders: Megan Gibbons and Scot Duncan, Birmingham Southern College. A natural history trip, emphasizing birds and salamanders, to the 1,000-acre nature preserve in the heart of Birmingham. A short hike on paths through moderate hills will be included. This will be a good time to view the early spring migrants. Binoculars strongly recommended. A twenty-minute drive from the Sheraton. Maximum of 20 participants.
4. **Ichthyology Field Trip**. *Cahaba River and/or tributaries, Jefferson and Shelby Counties, AL*. 8:00 a.m. – 12:00 p.m. Trip Leader: Bob Stiles, Samford University. The rich ichthyologic diversity of the Cahaba River. Sampling site selection dependent upon water levels. Small tributaries and springs will be visited in the event of high water. Darter species in breeding coloration will be highlighted. Maximum of 15 participants; some waders will be available.
5. **Little River Canyon Herpetological/Botanical Field Trip**. *Little River Canyon, DeKalb and Cherokee Counties, AL*. 8:00 a.m. – 3:00 p.m. Trip Leaders: Chris Murdock, Jacksonville State University and Wayne Barger, Alabama State Botanist. A natural history tour of the Little River Canyon Natural Preserve, one of the most spectacular canyons in North America. This area is rich in reptiles and amphibians and contains scattered colonies of the Green Pitcher Plant, *Sarracenia oreophila*. Educational opportunities at the Little River Canyon Field School will also be demonstrated. Location off I-59 in northeast Alabama, near Fort Payne. This will be on the way home for many of you. Some hiking involved. Maximum 20 participants.

### ***Human Diversity Committee Workshop***

The Human Diversity Committee will offer a workshop entitled, "**Graduate School Preparation: The What? Why? Where?**" from 2:30-4:30 on Thursday afternoon. This two-hour workshop will be of interest to students preparing for or just entering graduate school. There will be a panel discussion featuring graduate school admissions professional, Q&A session, and mock interview.

### ***Saturday Herbarium Curators Workshop***

SERNEC: Collaboration and Funding Opportunities

SERNEC (Southeast Regional Network of Expertise and Collections) is a five-year project funded by the National Science Foundation to develop a network of herbaria in the Southeast. This network is designed to encourage cooperation in databasing the region's collections by the year 2020, while at the same time developing herbaria as community centers for learning about plants. We have two goals to accomplish at this year's workshop:

Goal 1. Outreach to the community and to K-12 students and teachers. This aspect of the workshop will address methods of outreach via web sites, newsletters, local and regional media. It will also address state and regional methods to integrate our efforts with those of the K-12 learning community. This workshop will build the framework for meetings in 2009 and 2010 that will involve teachers in botanical learning.

Goal 2. Development of a "virtual campus" of curators and herbaria. The focus of this aspect of the workshop will be on activities to provide training opportunities to field schools, state and federal agencies and botanical gardens to train post-docs, graduate and undergraduate students and researchers in organismal and field based research methods and opportunities.

SERNEC (see SERNEC.ORG) is funded by the National Science Foundation as a Research Coordination Network. Through this grant we have monies to offset the cost of travel to this meeting. If you need additional information about this Curator's Workshop please contact Zack Murrell at [murrellze@appstate.edu](mailto:murrellze@appstate.edu).

**Speakers and Titles:** The Speaker Schedule and Presentation titles will be available online at the ASB website when it is finalized.

### ***Special Session and Luncheon: "Teaching Evolution in the Biology Classroom: Strategies and Challenges" sponsored by the ASB Education Committee***

The purpose of this workshop is to help young instructors and students deal with the issues surrounding the teaching of evolution in the biology classroom. The fundamental tenet of all disciplines of biology is the theory of evolution, yet

teaching of this concept is challenging for a variety of reasons. First, the modern theory itself can be difficult to express for beginning instructors, and second, we often face a skeptical audience who have been previously misinformed about the topic. The workshop will begin with a brief opening presentation outlining strategies that experienced instructors have utilized to maximize learning and how they dealt with challenges they faced. This will be followed by a round table discussion of these topics. Speakers will include Education Committee members plus additional colleagues experienced in the teaching of evolution. A pizza lunch will be provided to all participants. (Limit 30).

## ***Symposia***

### **Symposium I: Biodiversity Informatics: Progress and Potential in the Southeastern USA. (Thursday morning session)**

**Description:** Biodiversity informatics has the potential to provide significant contributions to our understanding of evolution, biotic responses to climatic change, ecology and conservation biology. In order to maximize the potential of this burgeoning field, the legacy data held in the life science collections must be made accessible to the greater science community.

There are many ongoing efforts to access the life science data housed in museums, colleges and universities, state and federal agencies and in private collections. These efforts fall into three categories: 1) data standards to maximize access, 2) taxon-by-taxon best practices to facilitate data acquisition, and 3) development of social networks to maximize participation among data providers.

At the global level, groups such as GBIF (Global Biodiversity Infrastructure Facility) and TDWG (Taxonomic Database Working Group) are working to develop standards. At a national level, NBII (National Biological Information Infrastructure) is working to facilitate data acquisition, management and dissemination. Various taxon-based groups have developed networks (HerpNet, Ornithology, Manis) that were initiated at the larger museums and are now working to include smaller regional collections. In contrast, the herbaria in the USA have organized into regional networks such as SERNEC, in a "bottom-up" approach to include the smaller collections. All of these social networks are working to facilitate communication and to recruit data providers.

Given the current technologies available to the scientific community, one can easily imagine a time when we have taxonomic, biogeographic and phylogenetic information at our fingertips for all living and fossil taxa. We can also imagine a time when these data layers, draped over geographic, ecological and climatic data layers, could provide a tremendous research tool for the life sciences and many related fields of study.

The historic role that the Association of Southeastern Biologists has played in organizing the life science community in the Southeast USA has also had the impact of developing a very strong social network across the region. The potential for an "all-taxa" database at a regional level is limited by 1) the extent of

collections available from an area and 2) the taxonomic expertise available to generate a "clean" dataset. Given the high levels of endemism, large tracts of conserved lands, high numbers of collections and a vibrant taxonomic community, the Southeast is uniquely positioned to develop a high quality virtual museum for the region.

This proposed provides an overview of best practices and ongoing efforts in biodiversity informatics. The ultimate goal of the symposium is to provide the framework that, when coupled with leadership from ASB, could result in positioning the Southeast to obtain funds and resources to become a global leader in biodiversity informatics.

**Speakers and Titles:** The Speaker Schedule and Presentation titles will be available online at the ASB website when it is finalized.

## **Featured Symposium: Friday Afternoon**

### ***Natural Selection in Past, Present and Future***

## **DARWIN BICENTENNIAL SYMPOSIUM AND TRIBUTES TO EDWARD O. WILSON**

**2009 ASB, Birmingham, Alabama  
April 3, 2009, Friday**

**Description:** The "Darwin Bicentennial Symposium" is a dedication to the bicentennial celebration of Charles Darwin who was born 200 years ago on Feb 12, 1809. This purpose also embraces the overarching impact of Darwinism and Neo-Darwinism on biology as a disciplinary science and humanity at large as influenced by evolutionary biology. This session focuses on the broad theme of "Natural Selection: Past, Present and Future" and is conceptually composed of two subthemes: Evolutionary biology in historical and 'Natural Selection' perspectives as well as the future of species of plants and animals and the ecosystems, land and aquatic environments in the light of threats of extinction caused by climate change.

### **Organizers and Moderators:**

Prof. Robert Y. George (President, George Institute for Biodiversity and Sustainability and UNCW Marine Biology Professor, 1973- 2003); and  
Prof. James Costa (Executive Director, Highland Biological Station and Professor of Biology, Western Carolina University)

1:00–1.30: James Costa (Western Carolina University): "Darwin evolving: Selection in Ecological Systems from Darwin to the Present (Historical Perspectives)"

- 1.30–2.00: Kenneth Sulak (University of Florida & USGS and student of Prof. Ed Wilson at Harvard in early 70s): “Reflections from “Encyclopaedia of Ichthyology, Ecology and Evolution and Darwin and Wilson as two prophets”
- 2.00–2.30: Robert Y. George (George Institute for Biodiversity and Sustainability): “Future: Ecosystem Evolution in the High Carbon Dioxide World”
- 2.30–3.00 COFFEE BREAK
- 3.00–3.30: Howard Neufeld (Appalachian State Univ.): “The Forgotten Component of Global Climate Change: Air Pollution as Driver of Plant Evolution”
- 3.30–4.00: Sylvia Earle (Explorer in Residence, National Geographic Society): “Sea Change: Protecting the Diversity of life in the Sea”.
- 4.00–4.30: TRIBUTES TO EDWARD O. WILSON (Harvard University) (Born in Birmingham, Alabama, 80 years ago)  
Tributes: 1. Jim Costa (Evolution/Entomology)  
2. Bob George (Consilience/Creation)
- 4.30–5.00: Edward O. Wilson’s Response: THE FUTURE
- Dialogue between presenters and attendees. ☺
- 

### ***Commercial Workshops***

Commercial workshops will also be available for all registered attendees! These workshops presented by exhibitors will allow you to learn about the latest tips from the experts. The fee for each workshop will be \$10 each, and you may register to attend one or more workshops during the Annual ASB Meeting. To register, and to read about the workshop descriptions, go to [www.asb.appstate.edu](http://www.asb.appstate.edu) and click on Attendee Registration & Information. Space is limited and you must pre-register for the commercial workshops, so don’t delay! All workshops will be held at the Sheraton Birmingham Hotel.

### ***Silent Auction***

ASB will again hold a silent auction next to the exhibitors. All of the proceeds will go towards supporting student travel to the annual meeting. Last year’s Silent Auction was a huge success. Come look at the items up for bid and help support our presenting students.

## ***Social Events***

**Wednesday night mixer:** Immediately following the Plenary Session, there will be a social mixer with hors d'oeuvres and a cash bar. The mixer is a long tradition at ASB meetings and is a great time to renew old acquaintances and make new ones. Be sure to sign up for this FREE event on the registration form.

### **Thursday night social: "SWEET HOME ALABAMA!"**

The Thursday night ASB social has always been a highlight of our annual meetings. The event has a longstanding tradition of great music, dancing and entertainment. Back by popular demand will be the six-piece band from legendary Muscle Shoals, Alabama – The Midnighters. Attendees at the 2005 annual meeting at the University of North Alabama will have fond memories of this band. Featuring vocalist Earnest Davis, the band plays a dynamic mixture of soul, funk and classic rock.

Weather permitting, the event will be held in the spacious courtyard between the Birmingham–Jefferson Civic Center and the Sheraton. A giant buffet will offer a generous sampling of traditional southern and Alabama foods. Quench your thirst with a variety of beers and ales, including a selection from the Birmingham microbrewery Good People Beer Company. A variety of superb wines will also be offered. It should be a fun and exciting evening for all.

**Friday night Awards Banquet:** The culmination of the annual meeting is the ASB Awards Banquet, where we honor the accomplishments of members and students. Delicious beef, chicken and vegetarian options are available. Following dinner, awards will be presented. Remember that long speeches are no longer a part of the banquet. (A reminder: those competing for ASB awards must register for and be present at the banquet in order to receive the award.)

## ***Lunches at the Sheraton***

Most eateries are more than a 15-minute walk from the Sheraton. On the grounds of the BJCC and the Sheraton are: 1) Casey's Sports Bar offering sandwiches, wings and chicken fingers; 2) Subway Sandwich Shoppe; 3) Pan Geos-a meat and 2 veggies restaurant in the Medical Forum; and 4) The Sheraton Atrium Café-A Buffet Lunch. Why not maximize your time and eat lunch at the Sheraton Atrium? The daily buffet at the Atrium will include an entrée, choice of vegetables, salad option, dessert, and a beverage for \$15.50. Include your ticket order on the Registration Form.

## ***Activities for Guests***

Attendees and family members will find many interesting places to visit in the Birmingham area. Within walking distance of the Sheraton are the Birmingham Civil Rights Institute, which documents the history and struggles of the civil rights movement throughout the years, and the Birmingham Museum of Art, particularly noted for its collection of art depicting the exploration of the western United States. The McWane Center has many interactive activities for children and a

world-class IMAX theater. Within 10 minutes traveling time from the Sheraton are the Birmingham Botanical Gardens and the Birmingham Zoo. The zoo has some new exhibits featuring Alabama animals. For a taste of the history of Birmingham, there is the Vulcan Statue and Sloss Furnace. Vulcan is the largest cast iron statue in the world and depicts the Roman god of fire and forge. It commemorated Birmingham's history of iron and steel production at the 1904 World's Fair. Sloss Furnace preserves the processes and methods of making iron during the last century. An hour and a half drive east of Birmingham is the Anniston Museum of Natural History. This museum features African animals, including a life-sized elephant mount and baobab tree, and life-sized dinosaurs. Next door is the Berman Museum which features a worldwide collection of guns and weapons.

For those wishing to sample a popular evening entertainment and dining district, there is Five Points South. It is located about four miles south of the Sheraton and near the UAB campus.

### ***Conference Badges***

You will receive your meeting badges when you arrive in Spartanburg. Simply proceed to the Registration Area in the Marriott to receive your badge. Family members of conference participants should ask for guest conference badges at the registration desk. **YOU MUST WEAR YOUR BADGE TO ALL FUNCTIONS, INCLUDING SOCIAL EVENTS!**

### ***Sponsorships/Industry Partners***

A wide selection of special sponsorships will be available to our Industry Partners. Please view the sponsorships on our web site: [www.asb.appstate.edu](http://www.asb.appstate.edu). For additional information you may call or e-mail our Meeting Coordinator, Scott Jewell, office: 336 421-0034, cell 336 213-7373, [A2ZConvention@yahoo.com](mailto:A2ZConvention@yahoo.com).

### ***Advertising***

The ASB is now offering advertising space in one or more issues of our quarterly publication, Southeastern Biology. Advertisers may also purchase space in our final on-site program, The ASB Schedule-At-A-Glance. Please view pricing structure, specifications and deadline scheduling on our web site: [www.asb.appstate.edu](http://www.asb.appstate.edu). For additional information you may call or e-mail our Meeting Coordinator, Scott Jewell, office: 336 421-0034, cell 336 213-7373, [A2ZConvention@yahoo.com](mailto:A2ZConvention@yahoo.com).

### ***Registration Information***

We encourage everyone to register early and save money. ASB offers 3 options for registration: 1) On-line @ [www.asb.appstate.edu](http://www.asb.appstate.edu); 2) US Mail sent to A2Z Convention Services, PO Box 1088 Mebane, NC 27302; 3) Fax directly to A2Z Convention Services 336-421-3425. Details of the options follow the registration form.



## ***The 70<sup>th</sup> Annual Meeting***

### **The Association of Southeastern Biologists**

**April 1-4, 2009  
Birmingham, AL**

***For assistance with registration, please contact***

**A2Z Convention Services  
Phone: 336 421-0034  
Fax: 336 421-3425**

#### ***Attendee Registration (Pre-Registration Deadline is 3/01/09)***

Note: To register for the meeting as an ASB member, your membership dues must be up to date. If you need to join or renew, you must either pay your dues online (instantly updated) or mail your check to the ASB treasurer at least three weeks before you register online. For **membership questions**, contact the ASB treasurer, Tim Atkinson (Tim.Atkinson@carolina.com; phone 336/538-6224).

\*Last Name \_\_\_\_\_  
 \*First Name \_\_\_\_\_ Middle Name \_\_\_\_\_  
 \*Institution/Organization \_\_\_\_\_  
 \*Address \_\_\_\_\_  
 \*Line 2 \_\_\_\_\_  
 \*City \_\_\_\_\_ \*State \_\_\_\_\_ \*Postal Code \_\_\_\_\_  
 \*Phone \_\_\_\_\_ \*Fax \_\_\_\_\_ Country \_\_\_\_\_  
 Cell Phone \_\_\_\_\_  
 \*\*E-Mail Address \_\_\_\_\_

\*Indicates a required field, \*\*You must provide an e-mail address to receive an immediate confirmation of your registration.

☐ Faculty  
☐ Graduate

☐ Undergraduate  
☐ Other \_\_\_\_\_

(Check all that apply)

## Pre-Registration

## On Site

**\$180.00**

**\$210.00**

**\$225.00**

**\$ 85.00**

\$100.00

\$120.00

\$210.00

\$245.00

\$260.00

\$100.00

**\$130.00**

\$145.00

**Social Events** (Please check all events you plan to attend; see Program for details)

w/Cash Bar

tickets x \$00.00 = \$

tickets x \$35.00 = \$

$$\text{tickets} \times \$30.00 = \$$$
**ASB Awards Banquet\***

tickets x \$45.00 = \$

Please indicate: Beef Chicken Vegetarian

**ASB Awards Banquet\***
$$\text{tickets} \times \$25.00 = \$$$

Please indicate: Beef Chicken Vegetarian

**\*Reminder: You must purchase a ticket and attend the banquet to be eligible for an ASB Award.**

$$\text{tickets} \times \$22.00 = \$$$

           tickets x \$20.00 = \$

           tickets x \$20.00 = \$

\_\_\_\_\_ tickets x \$22.00 = \$\_\_\_\_\_

tickets x \$22.00 = \$

**\*Guest/Spouse tickets for Thursday Night Social and Friday Night Awards Banquet must be purchased on site.**

**Additional Events** (Please check all events you plan to attend; see Program for details and time.)

Education Committee - Thursday Lunch Workshop "*Evolutionary Theory Workshop.*" (Session Limited to 30 participants.)

tickets x \$00.00 = \$

**SERNEC: Collaboration and Funding Opportunities Workshop**

\_\_\_\_\_ tickets x \$00.00 = \$ \_\_\_\_\_

**Human Diversity Committee-Graduate School Preparation: The What? Why? Where? and How?**

\_\_\_\_\_ tickets x \$00.00 = \$ \_\_\_\_\_

**Past President's ASB Leadership Seminar**

\_\_\_\_\_ tickets x \$00.00 = \$ \_\_\_\_\_

**Luncheon Tickets** (See Program for Details & Daily Menu)**Buffet Lunch @ the Sheraton**

See Program for Daily Menu Thursday

\_\_\_\_\_ tickets x \$15.50 = \$ \_\_\_\_\_

Friday

\_\_\_\_\_ tickets x \$15.50 = \$ \_\_\_\_\_

**Field Trips** (Please check all events you plan to attend; see Program for details)**Botanical Diversity Field Trip**

\_\_\_\_\_ tickets x \$10.00 = \$ \_\_\_\_\_

**Birmingham Botanical Gardens**

\_\_\_\_\_ tickets x \$10.00 = \$ \_\_\_\_\_

**Birding/Salamander Field Trip**

\_\_\_\_\_ tickets x \$10.00 = \$ \_\_\_\_\_

**Ichthyology Field Trip**

\_\_\_\_\_ tickets x \$10.00 = \$ \_\_\_\_\_

**Little River Canyon****Herpetological/Botanical Field Trip**

\_\_\_\_\_ tickets x \$10.00 = \$ \_\_\_\_\_

**BBB Field Trip to McWane Science Ctr**

\_\_\_\_\_ tickets x \$15.00 = \$ \_\_\_\_\_

**Commercial Workshops**

Commercial workshops will also be available for all registered attendees! These workshops presented by exhibitors will allow you to learn about the latest tips from the experts. The fee for each workshop will be \$10 each, and you may register to attend one or more workshops during the Annual ASB Meeting. To register and to read about the workshop descriptions, go to website [www.asb.appstate.edu](http://www.asb.appstate.edu) and click on Attendee Registration & Information. Space is limited and you must pre-register for the commercial workshops, so don't delay! All workshops will be held at the Sheraton's BJCC (Convention Center).

**Registration & Payment Information: (3 Options)**

**For Assistance with Registration: Please contact A2Z Convention Services 336-421-0034**

**Option A: Register Online with Credit Card**

Register on-line at [www.asb.appstate.edu](http://www.asb.appstate.edu) for secure online credit card payment. You must provide an e-mail address to receive an immediate confirmation of your registration.

**Option B: Fax Your Form with Credit Card**

Fax your completed registration form along with your credit card information to the ASB Conference Registration Manager at A2Z Convention Services: Fax # 336/421-3425. You must provide an e-mail address to receive an immediate confirmation of your registration.

**Option C: Mail Your Form with a Check**

Mail your completed registration form and your check to ASB, c/o A2Z Convention Services, PO Box 1088, Mebane, NC 27302. Please make your check payable to: The Association of Southeastern Biologists. You must provide an e-mail address to receive an immediate confirmation of your registration.

\_\_\_ Visa      \_\_\_ MasterCard      \_\_\_ Discover      \_\_\_ AMEX

CC# \_\_\_\_\_ Exp \_\_\_\_/\_\_\_\_

3 digit security code on back of card \_\_\_\_

Name As It Appears On Card \_\_\_\_\_

Credit Card Billing Address

\*Last Name \_\_\_\_\_ \*First Name \_\_\_\_\_

\*Institution/Organization \_\_\_\_\_

\*Address \_\_\_\_\_

\*Line 2 \_\_\_\_\_

\*City \_\_\_\_\_ \*State \_\_\_\_\_ \*Postal Code \_\_\_\_\_

\*Phone \_\_\_\_\_

**Cancellation policy:** A full refund will be issued (less a \$25 handling fee) if ASB is notified in writing at the above address on or before Jan. 15, 2009. After Jan. 15, 2009, no refund will be granted. Requests must be postmarked by Jan. 15, 2009 to receive a refund.

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**70<sup>th</sup> Annual ASB Meeting Invitation to Exhibit and Present  
Workshops, Industry Partners & Advertising  
Birmingham, Alabama  
Sheraton Birmingham and the BJCC  
April 1-4, 2009**

This four-day event brings together approximately 1,000 biologists from across the southeastern United States. The meeting features a distinguished plenary speaker, special symposia, field trips, oral and poster presentations, workshops, networking and social events, and more.

The Annual Meeting provides you with the exclusive opportunity to showcase your products and/or services to this large and important audience of faculty, students, researchers, conservation workers, military and government personnel, and business professionals with a common interest in biological issues. Interests are diverse, but range from genetics and molecular biology, to physiology and population biology, to community and ecosystem ecology.

### **About ASB**

The Association of Southeastern Biologists (ASB) was established in 1937 by biologists concerned with the quality of biological research in the southeastern United States. Today, ASB is the largest regional biology association in the country, and is committed to the advancement of biology as a science by the promotion of science education, research, and the application of scientific knowledge to human problems.

### **2009 Exhibitor Benefits**

ASB is committed to maximizing your exposure and has scheduled a number of special events in the Exhibitor Showcase. The ASB Annual Conference allows for exposure to over 800 attendees dedicated to the advancement of biology.

#### **~Poster Sessions**

Research posters will be displayed in the Exhibit Hall throughout the conference. ASB poster sessions are heavily attended. Exhibitors receive added exposure from this well attended event throughout the conference.

#### **~Posters & Pastries**

Attendees will view posters while enjoying AM & PM coffee breaks in the Exhibit Hall on Thurs & Fri. Refreshment area is located in the back of the Exhibit Hall for maximum traffic flow.

~Commercial Workshops

Exhibitors may target attendees who participate in a 50-minute commercial workshop presented by the exhibitor at no additional charge.

~Signage

Special Exhibit Hall signage recognizing exhibitor participation.

~Networking at Social Events

Wed Night Welcome Reception, Thurs Night Social, Fri Night Banquet. Take advantage of getting to know attendees during these informal marketing events.

~Year-Round Advertising & Marketing Opportunities

ASB provides a hot link to your company for each qualifying Exhibitor. The link will remain on the ASB web site throughout the year for your convenience.

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## **Explanation of Exhibiting Options at the Annual Association of Southeastern Biologists Birmingham, AL**

### **3 Options**

#### *Option A:*

##### Regular Exhibitor (Located In the Exhibit Hall)

Exhibitor Package: Each \$975 booth consists of (1) 10' x 10' booth, 8' back drape, 3' side drapes, (1) 8' X 24" white covered table with skirting, 2 chairs and 1 wastebasket, security services, hot link from ASB Web Site, 2 tickets to Thurs Night Social-"Sweet Home Alabama", AM & PM breaks, Exhibitor Pizza Party during installation, exhibit hall signage, booth identification sign, recognition announcements and one 50-minute commercial workshop with **full** payment of booth, 2 complimentary badges for employees only (additional badges are \$130/person), 25 word description will appear in the final show program, Private Exhibitor-Only Lounge, 2 tickets to the Patrons & Exhibitors Breakfast.

*Option B:*Table Top Exhibit (Located Outside the Exhibit Hall in the Pre-Function Area)

Each \$375 table top booth consists of one 6' X 24" white covered draped table, 1 folding chair, 1 ticket to Thurs Night Social-"A Night of Beach", AM & PM breaks, Exhibitor Pizza Party during installation, exhibit hall signage, 1 complimentary badges for employee only (additional badges are \$130/person), 25 word description will appear in the final show program. Private Exhibitor-Only Lounge, 2 tickets to the Patrons & Exhibitors Breakfast. Backdrops (of any type) are not permitted in this area.

*Option C:*Publishers Book Exhibit (\$150 per title)

Attention Publishers & Authors!!! Can't make it to the meeting this year? No problem..... Each title is displayed in the Exhibit Hall in the ASB Publishers Book Exhibit Booth. Provide one copy of your publication and up to 500 copies of your accompanying literature. ASB will provide one 8" X 10" tabletop sign to announce your publication and display all 3 throughout the entire convention. (Your publication will not be returned.)

**Exhibit Hall Hours**Wednesday, April 1st

9 am – 4 pm	Exhibitor Move-In
12 noon-2 pm	Exhibitor Pizza Party
6 pm –10 pm	ASB Welcome Reception-University of Alabama-Birmingham & Jacksonville State University
	Exhibit Hall is NOT Open,

All exhibitors are invited and welcomed to attend the plenary session and welcome reception. Exhibitors who wish to sell items at this event will be provided a table in the reception area.

Thursday, April 2nd

8 am-5 pm	Exhibits Open
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Friday, April 3rd

8 am-2 pm	Exhibits Open
2 pm-4 pm	Exhibitor Move-Out

In recognition of your support of ASB, all Exhibitors are welcomed to attend the Free Exhibitors and Patrons Breakfast. A separate letter of invitation will be mailed to you in early 2009.

# Silent Auction

\_\_\_\_\_ Yes, I would like to contribute to the Silent Auction to help with student travel to the Annual Meeting.  
(100% of all proceeds to benefit student travel)

Partial List of Items Donated at the 2008 Annual Meeting in Spartanburg, South Carolina.

- Dissection Set
- Corporate Gift Certificates
- Frog Model
- Dinner for Two
- Two Nights Hotel Accommodations
- Charts
- Wine Gift Basket
- Educational Charts
- Microscope
- Books

Description of Item(s) to be donated

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Please check appropriate option:

\_\_\_\_\_ Please contact me at the convention to pick-up donation

\_\_\_\_\_ I will mail donation to Scott Jewell, ASB Meeting Planner before March 15, 2009.

Signature	Date	phone
_____		
Title	E-mail	
_____		

Return form by **March 15, 2009** to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.



## Exhibitor Booth Registration Form

2009 Association of Southeastern Biologists

April 1-4, 2009 Birmingham, AL

Sheraton Birmingham & the BJCC

**Exhibitor Package:** Each \$975 booth consists of (1) 10' x 10' booth, 8' back drape, 3' side drapes, (1) 8' X 24" white covered table with skirting, 2 folding chairs and 1 wastebasket, security services, hot link from ASB Web Site, 2 Tickets to Thurs Night Social-"Sweet Home Alabama", AM & PM breaks, Exhibitor Pizza Party during installation, exhibit hall signage, booth identification sign, recognition announcements and one 50-minute commercial workshop with full payment of booth, 2 complimentary badges for employees only (additional badges are \$130/person), 25 word description will appear in the final show program (The exhibit hall is carpeted)

Company/Organization \_\_\_\_\_  
(Please list company name as you wish it to appear on printed materials)

Representative (The person who will receive the Exhibitor Service Kit):  
\_\_\_\_\_

If you need additional Service Kits, please e-mail: [A2ZConvention@yahoo.com](mailto:A2ZConvention@yahoo.com)

Email Address: \_\_\_\_\_

Contact Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Web Site: (Hot Link from ASB Web Site) \_\_\_\_\_

25-Word Workshop Description:

Please submit description via e-mail to [A2ZConvention@yahoo.com](mailto:A2ZConvention@yahoo.com)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Description will be appear in Final Show Program of Southeastern Biology)

Qty	Item	Amount
_____	Patron Member Booth	included
_____	1 <sup>st</sup> Booth	\$975
_____	Each Additional Booth	\$500
_____	Pre-Function Area Table Top Display (No backdrop Allowed)	\$375
_____	Publishers Book Exhibit	\$150/title
_____	Yes, I would like an AD in <i>Southeastern Biology</i> , Final On Site Program (circle choice) 1/4 page=\$250, 1/2 page=\$375, full page=\$500 (Patron Included)	\$ _____
Total Amount Enclosed		\$ _____

Requested Booth Number (see Floor Plan):

1st choice \_\_\_\_\_ 2nd choice \_\_\_\_\_ 3rd choice \_\_\_\_\_

**Hold Harmless Clause:** The Exhibitor assumes all responsibility and liability for losses, damages and claims arising out of injury to the exhibitor's display, equipment and other property brought upon the premises of the convention facilities and shall indemnify and hold harmless the association agents, servants and employees as well as the ASB organization from any losses, damages and claims.

Upon acceptance by ASB, this signed application and Exhibitor Contract form becomes the contract for booth rental for the 2009 ASB Annual Convention. Exhibitor's will be notified of their acceptance by letter no later than 15 Dec 08. Refund Policy: 50% on or before 15 Dec 08, 0% on or after 16 Dec 08.

Signature \_\_\_\_\_

Date \_\_\_\_\_

Title \_\_\_\_\_

E-mail \_\_\_\_\_

Return Form with Check by **Nov. 30, 2008** to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.

**Early Bird Discount: \$100 off the \$975 booth, if payment and application received prior to Nov. 30, 2008**



## Exhibitor Commercial Workshop Form

2009 Association of Southeastern Biologists  
April 1-4, 2009 Birmingham, AL  
Sheraton Birmingham & the BJCC

Workshop Description: All Commercial Workshops will be conducted during the meeting on a first-come first-served basis. Classroom style seating will be provided at no additional charge to the presenter. Each classroom will be set for a minimum of 50 participants. A screen will be provided for each room. LCD projectors and laptops will **not** be provided. One workshop per application please. **Deadline for submission is Jan. 1, 2009**

Company/Organization \_\_\_\_\_  
(Please list company name as you wish it to appear on printed materials)

Presenter \_\_\_\_\_ Email Address: \_\_\_\_\_

Contact Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Workshop Title: \_\_\_\_\_

50-Word Workshop Description:  
Please submit description via e-mail to [A2ZConvention@yahoo.com](mailto:A2ZConvention@yahoo.com)

\_\_\_\_\_  
(Description will be appear in Final Show Program of Southeastern Biology)

Please indicate which time slot you prefer below:

Pre-Conference Workshop on Wed 4pm-5:30pm \_\_\_\_\_

Thurs 8:30am-10am\_\_\_\_ Thurs 10:30am-12noon\_\_\_\_ Thurs 1:30pm-3pm\_\_\_\_

Thurs 3:30pm-5pm\_\_\_\_ Fri 8:30am-10am\_\_\_\_

Qty	Item	Amount
_____	Workshop Fee (Included With Booth Payment)	n/a
_____	Workshop Fee (Without Exhibiting)	\$300
	Total Workshop Amount	\$_____

#### Hold Harmless Clause

The workshop presenter assumes all responsibility and liability for losses, damages and claims arising out of injury to the presenter's display, equipment and other property brought upon the premises of the convention facilities and shall indemnify and hold harmless the association agents, servants and employees as well as the ASB organization from any losses, damages and claims.

Upon acceptance by ASB, this signed application and Workshop Contract form becomes the contract for the 2009 ASB Annual Convention. Workshop presenter will be notified of their acceptance by letter/e-mail no later than 1 Feb. 09.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

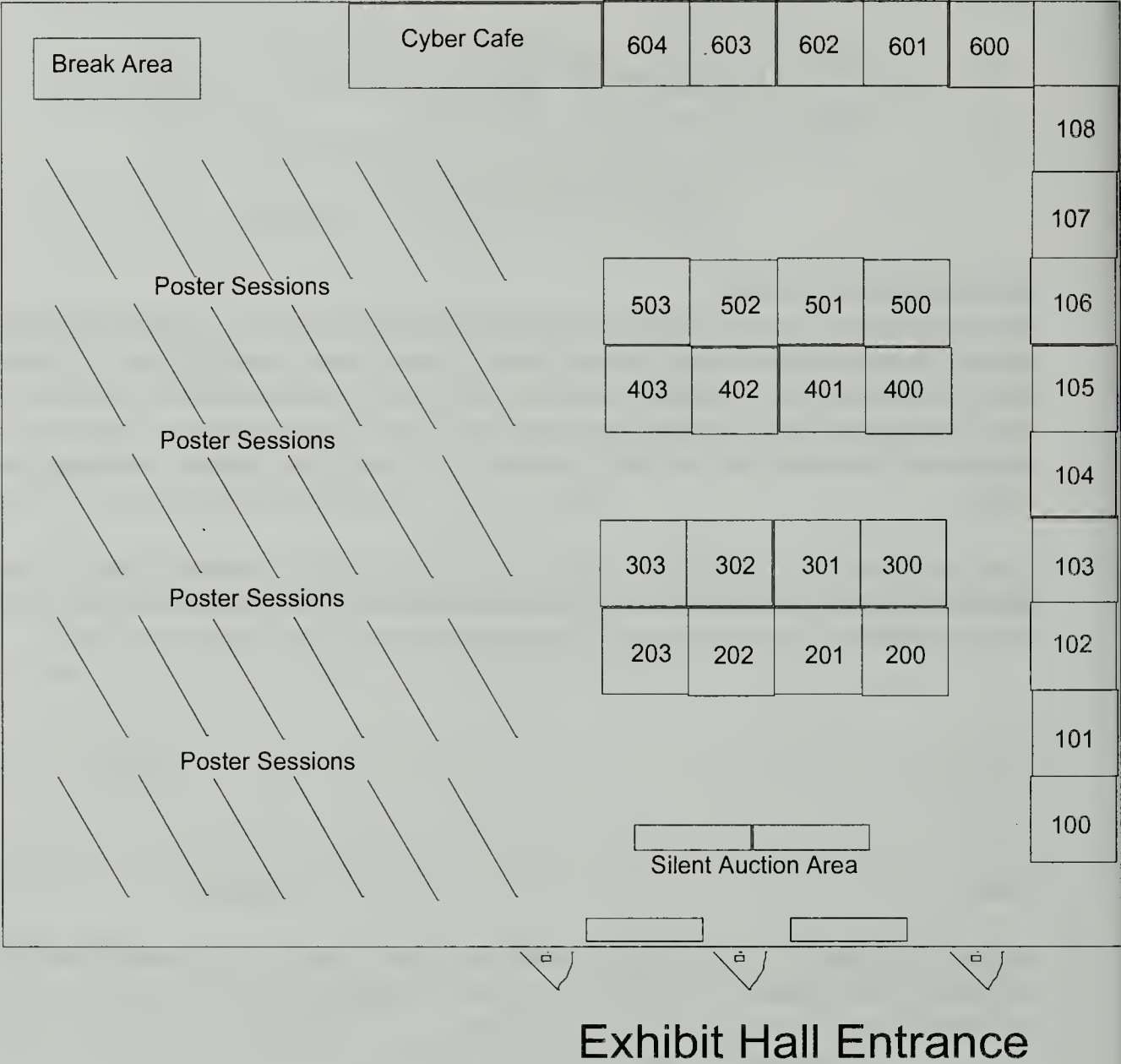
\_\_\_\_\_  
Title

\_\_\_\_\_  
e-mail

Return Form with Check by **Jan. 1, 2009** to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.

**70<sup>th</sup> Annual ASB Exhibit Hall Floor Plan**

ASB 2009 Birmingham, AL  
1-4 April, 2009  
Sheraton Birmingham Ballroom



\*Exhibitor Service Kits to be mailed by 1 March 2009

## Advertising with the Association of Southeastern Biologists

Reach Your Target Audience and  
Promote your Products and Services Throughout the Year!!  
Advertise in Southeastern Biology.

Advertise in Southeastern Biology and reach over 1,500 members from 40 states and 13 countries. ASB publishes 4 issues of Southeastern Biology per year and an On-Site Program for the Annual Meeting. Choose one or both opportunities to increase your marketing exposure. Promote your products and services throughout the year!

$\frac{1}{4}$  Page 1 $\frac{1}{2}$ " X 1"       $\frac{1}{2}$  Page 3" X 2"      Full Page 7 $\frac{1}{2}$ " X 4  $\frac{3}{4}$ "

\_\_\_\_\_ Yes I would like an AD in all 4, issues of Southeastern Biology, (circle choice)  
    $\frac{1}{4}$  page=\$200,  $\frac{1}{2}$  page=\$325, full page=\$425

\_\_\_\_\_ AD in Final On Site Program (circle choice)  
    $\frac{1}{4}$  page=\$175,  $\frac{1}{2}$  page=\$225, full page=\$275

\*All ads are black and white and must be submitted in pdf.

Signature \_\_\_\_\_ Date \_\_\_\_\_ phone \_\_\_\_\_

Title \_\_\_\_\_ e-mail \_\_\_\_\_

\_\_\_ Visa      \_\_\_ MasterCard      \_\_\_ Discover

CC# \_\_\_\_\_ Exp \_\_\_/\_\_\_ 3 digit code on back of credit card \_\_\_/\_\_\_/\_\_\_

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\*Line 2 \_\_\_\_\_

\*City \_\_\_\_\_ \*State \_\_\_\_\_ \*Postal Code \_\_\_\_\_

\*Phone \_\_\_\_\_

Return Form with Check or Credit Card Information to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.

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Confirmation Sent on Date: \_\_\_\_\_ via \_\_\_\_\_



## Industry Partners Form

2009 Association of Southeastern Biologists

April 1-4, 2009 Birmingham, AL

Sheraton Birmingham & the BJCC

       **Yes,** I Would Like to Partner with ASB and Participate in the Industry Partners Program!!

Company/Organization \_\_\_\_\_  
(Please list company name as you wish it to appear on printed materials)

Representative: \_\_\_\_\_ Email Address: \_\_\_\_\_

Contact Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

\*Special Recognition at Thurs Night Social, Friday Night Banquet, signage at the Convention Center and a listing in Final Show Program of Southeastern Biology!

Qty	Item	Amount
_____	Wed Night Cash Bar (4 Opportunities)	\$500/opportunity
_____	Coffee Breaks (8 Opportunities)	\$500/opportunity
_____	Thurs Night Social (4 Opportunities)	\$900/opportunity
_____	Fri Night Banquet Cash Bar	\$850
_____	Yes, I wish to present a workshop	See Workshop Form
_____	24 Hour Exhibit Hall Security	\$1,000
_____	ASB Executive Committee Breakfast	\$350
_____	Yes, I would like to Donate an Item to the Silent Auction to help w/ Student Travel	
_____	ASB Web Site Hot Link to Your Company (12 months)	\$375
_____	Yes, I would like an AD in all 4, 2009 issues of <i>Southeastern Biology</i>	
	(circle choice) ¼ page=\$200, ½ page=\$325, full page=\$425	
_____	AD in Final On Site Program	
	(circle choice) ¼ page=\$175, ½ page=\$225, full page=\$275	

Industry Partners Total \$ \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Title \_\_\_\_\_ e-mail \_\_\_\_\_

Return Form with Check by **1 Jan. 2009** to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.



**Exhibit Hall Badge Form**

2009 Association of Southeastern Biologists  
April 1-4, 2009 Birmingham, AL  
Sheraton Birmingham & the BJCC

**FAX This Completed Form Before 3/01/09 To Scott Jewell, ASB  
Meeting Planner**

**FAX # 336/421-3425**

Company/Organization \_\_\_\_\_

Name \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

Additional Badges \$130/ea

Name \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**Note:** Each Company receives two complimentary exhibit hall passes per 10' X 10' or tabletop booth payment. Badges are to be used for company employees only. Partnering companies must pay \$130 to register for the ASB Conference.  
**BADGES MUST BE WORN TO BE ADMITTED INTO ALL FUNCTIONS!!!**



**Re-Cap & Payment Information**

Description	Amount
Exhibiting Full Booth	\$ _____
Exhibiting Table Top	\$ _____
Publishers Book Exhibit	\$ _____
Advertising	\$ _____
Industry Partners	\$ _____

**Mail or Fax Your Forms**

Fax or mail your completed registration form along with your credit card information or check to: Scott Jewell, ASB Meeting Planner, PO Box 1088, Mebane, NC 27302; A2Zconvention@yahoo.com, 336/213-7373 cell, 336/421-0034 office, 336/421-3425 fax.

\_\_\_ Visa                      \_\_\_ MasterCard                      \_\_\_ Discover

CC# \_\_\_\_\_ Exp \_\_\_\_/\_\_\_\_

Name As It Appears On Card \_\_\_\_\_

**Credit Card Billing Address**

\*Last Name \_\_\_\_\_ \*First Name \_\_\_\_\_

\*Company/Organization \_\_\_\_\_

\*Address \_\_\_\_\_

\*Line 2 \_\_\_\_\_

\*City \_\_\_\_\_ \*State \_\_\_\_\_ \*Postal Code \_\_\_\_\_

\*Phone \_\_\_\_\_

**Office Use Only**

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Paid with credit card # \_\_\_\_\_ on Date: \_\_\_\_\_ Rec'd by \_\_\_\_\_

Confirmation Sent on Date: \_\_\_\_\_ via \_\_\_\_\_

**LOCAL COMMITTEE ASSIGNMENTS  
FOR THE 70<sup>TH</sup> ANNUAL MEETING  
UNIVERSITY OF ALABAMA-BIRMINGHAM, BIRMINGHAM, AND  
JACKSONVILLE STATE UNIVERSITY, JACKSONVILLE**

<i>Local Arrangements Co-Chairs:</i>	Ken Marion <a href="mailto:jkmarion@uab.edu">jkmarion@uab.edu</a> George Cline <a href="mailto:gcline@jsu.edu">gcline@jsu.edu</a>	(205)934-8309 (256)782-5798
<i>Program Committee:</i>	George Cline <a href="mailto:gcline@jsu.edu">gcline@jsu.edu</a> James Rayburn <a href="mailto:jrayburn@jsu.edu">jrayburn@jsu.edu</a>	(256)782-5798 (256)782-5803
<i>Field Trips:</i>	Chris Murdock <a href="mailto:murdock@jsu.edu">murdock@jsu.edu</a> Larry Davenport <a href="mailto:ljdavenp@samford.edu">ljdavenp@samford.edu</a>	(256)782-8440 (205)726-2584
<i>Social Events:</i>	Mark Meade <a href="mailto:mmeade@jsu.edu">mmeade@jsu.edu</a> Rob Angus <a href="mailto:raangus@uab.edu">raangus@uab.edu</a> Terry Richardson <a href="mailto:tdrichardson@una.edu">tdrichardson@una.edu</a>	(256)782-5638 (205)934-3582 (256)765-4492
<i>Volunteer Coordinators:</i>	Taba Hamissou <a href="mailto:taba@jsu.edu">taba@jsu.edu</a>	(256)782-5040
<i>Tri-Beta Coordinators:</i>	Robert Carter <a href="mailto:rcarter@jsu.edu">rcarter@jsu.edu</a>	(256)782-5144
<i>Audiovisual Coordinator:</i>	James Rayburn <a href="mailto:jrayburn@jsu.edu">jrayburn@jsu.edu</a>	(256)782-5803
<i>Silent Auction:</i>	Megan Gibbons <a href="mailto:mgibbons@bsc.edu">mgibbons@bsc.edu</a> Pete Van Zandt <a href="mailto:pvanzand@bsc.edu">pvanzand@bsc.edu</a> Sharryse Henderson <a href="mailto:shenders@highlands.edu">shenders@highlands.edu</a>	(205)226-4874 (205)226-7817 (678)872-8112
<i>Meeting Coordinator:</i>	Scott Jewell <a href="mailto:a2zconvention@yahoo.com">a2zconvention@yahoo.com</a>	(336) 421-0034

*The Meeting Coordinator handles Commercial Exhibits & Workshops, Registration, Hotel Accommodations, and Transportation.*

## **Affiliate Societies Meeting with ASB**

### **APRIL 1-4, 2009**

The following affiliate societies will be in attendance at the 2009 Annual Meeting. We anticipate an excellent diversity of paper and poster presentations. The societies and their contacts are listed below.

#### **Beta Beta Beta Southeastern District I**

Dr. Virginia Martin  
Queens College of Charlotte  
1900 Selwyn Avenue  
Charlotte, NC 28274  
(704) 337-2261  
e-mail: martin@rex.queens.edu

#### **Beta Beta Beta Southeastern District II**

Dr. Christi Magrath  
Dept. of Biological & Env. Sci.  
Troy University  
Troy, AL 36082  
(334) 670-3622  
e-mail: cmagrath@troy.edu

#### **Botanical Society of America Southeastern Section**

Dr. Lytton John Musselman  
Mary Payne Hogan Professor of  
Botany and Chair  
Department of Biological Sciences  
110 Mills Godwin Building/45th St  
Old Dominion University  
Norfolk, VA 23529-0266  
(757) 683 3595; Fax: (757) 683 5283  
e-mail: lmusselm@odu.edu  
<http://web.odu.edu/lmusselman>

#### **Ecological Society of America Southeastern Chapter**

Dr. Joel Gramling  
Department of Biology  
171 Moultrie Street  
The Citadel  
Charleston, SC 29409  
(843) 953-6459; Fax (843) 953-7264  
E-mail: joel.gramling@citadel.edu

#### **Society of Herbarium Curators**

Dr. John Nelson  
Department of Biological Science  
University of South Carolina  
Columbia, SC 29208  
(803) 777-8196  
e-mail: nelson@biol.sc.edu

#### **Society of Wetland Scientists South Atlantic Chapter**

Dr. Kimberli J. Ponzio  
St. Johns River Water Mgt. District  
P.O. Box 1429, Palatka, FL 32178  
(386) 329-4331  
e-mail: kponzio@sjrwmd.com

#### **Southern Appalachian Botanical Society**

Dr. Conley K. McMullen  
Department of Biology  
James Madison University  
Harrisonburg, VA 22807  
(540) 568-3805; Fax: (540) 568-3333  
e-mail: mcmulck@jmu.edu

## ***SPECIAL REMINDERS FROM THE PRINT EDITOR***

### ***ASB BANQUET ATTENDANCE***

Please keep in mind that recipients of ASB awards must be present at the annual ASB banquet to receive the award. Therefore, all applicants for ASB awards must attend the banquet to insure the presence of the winners.

### ***MEMBERSHIP UPDATE***

Please make sure your membership status is up-to-date amply before the deadline for abstract submission and for annual meeting registration. Please be aware that mailing a check or money order for membership renewal to the treasurer and then trying to register online or by mail for the annual meeting on the same day does not work. Moreover, trying to pay for membership renewal online in tandem with registering for the annual meeting online does not work well either.

### ***EXTRA ABSTRACT SUBMISSION***

Besides sending abstracts of papers and posters to the Program Committee by January 16, 2009, anyone wishing to be considered for an award must send an abstract to the respective award committee chairperson in order to be considered. Checking the box on the registration form for the award is not enough. An abstract must be sent to the chairperson by January 30, 2009.

### ***INSTRUCTIONS FOR SUBMITTING ORAL PRESENTATIONS***

All oral presentations will be done using **Microsoft PowerPoint 2003** only. Presenters should bring a backup copy on a CD or USB memory drive. **Complete and final presentations must be submitted on-line to the ASB website by 23 March.**

For questions contact **Dr. James Rayburn, Biology Department, Jacksonville State University, 700 Pelham Road North, Jacksonville, AL 36265-1602 (256) 782-5803 jrayburn@jsu.edu.**

## PROPOSED MEMBERSHIP DUES INCREASE

As you can see in the table below, membership dues do not meet the expenses incurred for printing and mailing Southeastern Biology.

### SOUTHEASTERN BIOLOGY PROFIT & LOSS 1999-2007

Southeastern Biology Receipts 1999-2007	\$148,973.00
Southeastern Biology Expenses 1999-2007	\$(163,214.00)
SEB ENDING BALANCE 1999-2007	\$(14,241.00)

Because of the need to maintain fiscal stability for ASB, the ASB Executive Committee will present the increase in dues indicated below, for a vote by the ASB members at the annual business meeting in Birmingham, April 3, 2009. If approved by the members, the increase will take effect immediately.

MEMBERSHIP	CURRENT	PROPOSED
Regular	\$35	\$50
Regular, 3 years	\$95	\$135
Family	\$40	\$55
Student	\$15	\$20
Emeritus	\$15	\$20
Contributing	\$70	\$100
Sustaining	\$140	\$200
Life	\$350	\$500
Patron	\$750	\$1000
Library	\$40	\$55
Library, 3 years	\$100	\$145

### AVAILABLE POSITION IN THE SOUTHEAST

**Ecology: Salem College**, a liberal arts college for women, seeks assistant professor, Fall 2009, to teach ecology, botany, plant taxonomy and a course in the candidate's specialty, and to develop an undergraduate research program in ecology/field biology. Send cover letter including teaching philosophy and research interests, CV, transcripts, and contact information for three references to the Ecology Search Committee, Salem College, 601 S Church St., Winston-Salem, NC 27101 or email [moore@salem.edu](mailto:moore@salem.edu). Review of applications currently ongoing until position is filled. EOE. [www.salem.edu](http://www.salem.edu).



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**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS  
EXECUTIVE COMMITTEE MEETING  
WEDNESDAY, 16 APRIL 2008  
SPARTANBURG, SOUTH CAROLINA**

ATTENDANCE: 17 individuals attended the meeting

<b>NAME</b>	<b>CAPACITY</b>
Michael Dennis	President
Tom Wentworth	President-Elect
Patricia Cox	Vice President
Nicole Turrill Welch	Secretary
Tim Atkinson	Treasurer
Don Roush	EC Member-at-Large
Doug Rayner	EC Member-at-Large
Jennifer Davis	EC Member-at-Large
Dennis Haney	EC Member-at-Large
Wayne Van Devender	EC Member-at-Large
Katie Greenberg	EC Member-at-Large
John Herr	Archivist
James Caponetti	Print Editor
Terry Richardson	Membership Officer
Joe Pollard	LAC 2008
Ken Shull	Chair, Meritorious Teaching Award Committee
Nitya Jacob	Chair, Senior Research Award Committee

President Mike Dennis called the meeting to order at 1:42 pm and welcomed everyone to Spartanburg, SC. Mike then introduced Bill Taylor, of BDA, Inc., and explained that Bill will be taking photographs during the course of the 2008 Annual Meeting. Everyone thanked Bill and agreed that his service will be most valuable for documenting the year's meeting in *Southeastern Biology* and the archives.

### **1. Approval of Minutes**

Motion 1. It was moved that the 22 September 2007 Executive Committee Meeting minutes be approved following minor editing. The motion was made by Don Roush and seconded by Tom Wentworth. The requested edits were noted and the motion passed.

### **2. Officer Reports**

**President** – Since the 22 September 2007 meeting of the Executive Committee, Mike Dennis conducted the routine business of the Association and, following the approval of the Executive Committee, appointed Debbie Atkinson as Database Manager and Terry Richardson as Membership Officer. He assisted John Herr with the copious revisions to the Leadership Guide, guided much discussion of the proposed change to the President's term, and wrote *The View From Here*, published in *Southeastern Biology* 55(2):97-98.

**President Elect** - Tom Wentworth provided insight to Dr. Bill Schlesinger's talk, scheduled for this evening as part of the Plenary Session. Since our last meeting, Tom worked with John Herr regarding the wording of the proposed amendments to the ASB Constitution and Bylaws, and cascading changes related to the proposed 2-year President's term. Tom also assembled a book that will reside at the ASB booth during the Annual Meetings – this book will provide an avenue of communication for members interested in serving on committees or being nominated for an office. Mike Dennis shared that he tried something similar last year with mixed success. John Herr and Dennis Haney said that appropriate sections of the Leadership Guide, Committee Portfolios, and Officer/Committee Chair Report forms should be distributed to those expressing interest to better explain the duties of each office or committee.

Mike Dennis shared that some members have expressed concern that we are not having the traditional Past-Presidents addresses at the Banquet. Tom noted that the Past President's address would be every other year, if the proposed changes in the President's term are approved by the membership. He suggested that each Past President be given the option of presenting a talk at the Banquet, writing an article for *Southeastern Biology*, or both. We discussed his suggestion and concluded that each Past President can make their wishes known to the President.

**Past President** – Kim Marie Tolson's report was read into these Minutes. She compiled current contact information of extant Past Presidents for the in-coming Past President. All Past Presidents and President, Mike Dennis, were invited to attend this year's Past Presidents Breakfast.

**Vice President** – Patricia Cox reported that she arranged the breakfast for all Patrons and Exhibitors attending the 2008 Annual Meeting. She shared a copy of the invitation sent and a copy of this invitation was included in her Vice President's Report.

**Secretary** – Nicole Turrill Welch prepared a variety of documents for the 2008 Executive Committee meetings and the Annual Meeting. Following her expression of concern regarding standard files used by the Secretary, Terry Richardson volunteered to send Nicole files associated with his previous service as Secretary.

**Treasurer / Finance Committee** – Tim Atkinson shared financial reports for the Association and Enrichment Fund and commented on the activities of the Finance Committee. In order to simplify and clarify reporting, the Finance Committee divided the budget into three sections: (1) Southeastern Biology, (2) Annual Meeting, and (3) Enrichment Fund. Tim enthusiastically, yet cautiously, reported that, for the first time in seven years, we did not suffer an overall deficit because more members are current on dues and the Enrichment Fund increased thanks to fundraising efforts by the President and Finance Committee at the 2007 Annual Meeting. While the finances of our Association have improved, more monies are needed, as one poorly attended Annual Meeting could jeopardize our financial stability. Much discussion of the benefits and consequences of raising dues and/or registration fees for Annual Meeting followed. President Mike

Dennis thanked Tim and the Finance Committee for their work, the Executive Committee for the contributions to the discussion, and urged that we must resolve this issue.

Tim Atkinson also reported that Martin Microscope Company and the Robert H. Martin, Sr., family have endowed a new award, the Robert H. Martin Professional Excellence Award.

Motion 2. Doug Rayner moved that the Executive Committee graciously accept the donation and proposal from the Martin Family to establish a fund for the Robert H. Martin Professional Excellence Award, and set up the mechanisms for its administration. Wayne Van Devender seconded the motion. Following discussion of the relationship of this award to the Meritorious Teaching Award, the motion passed.

Mike Dennis and Tim Atkinson agreed to write a letter of thanks to the family. Chair of the Resolution Committee, Kim Marie Tolson, and Nicole Welch proceeded to draft a Resolution of Thanks to Martin Microscope Company and the Robert Martin, Sr., family.

While on the subject of our Association's highest awards, the report from the Meritorious Teaching Award Committee was shared.

Meritorious Teaching Award Committee - Chair, Ken Shull reported that 24 people were nominated for the 2008 Award, but 12 were not qualified because they had not taught 10 years on the college level. Also, several nominees had been members of ASB for less than two years. The Committee proposed that nominees be ASB members for at least five years to be eligible for the Meritorious Teaching Award. Ken also suggested that the retention of the applications be increased from two to four years.

Motion 3. Don Roush moved that we change the length of time the nominee must be a member of ASB from 5 to 10 years. Pat Cox seconded the motion. The motion passed.

**Archivist** – John Herr maintained the Archives of the Association and devoted much time to revising the Archive System and the Leadership Guide.

Motion 4. Jim Caponetti moved to adopt the Leadership Guide as it stands, with the understanding that it is a "living document" and, therefore, can be modified as needed in the future without motions. Tom Wentworth and Wayne Van Devender seconded the motion and the motion passed following discussion of how the Secretary will keep the Leadership Guide, By-Laws, and Constitution current.

**Print Editor Report** – Jim Caponetti reported that the objectives for changing the month of issues of *Southeastern Biology* have been met with a \$2000 reduction in cost. A member of ASB formally raised the issue of stopping the production and delivery of hard copies of *Southeastern Biology* to the membership. Jim stressed his opinion that *Southeastern Biology* is a critical part of ASB and should be maintained as a hard-copy document, in spite of some interest in doing away with hard copies. There was no expressed support from the Executive Committee for doing away with hard copies of *Southeastern Biology*.

**Web Editor** – Dwayne Wise's report was read into these Minutes. He shared that Amanda Myrick has replaced Adam Jones as the web designer. Officer and Committee information was updated and a News feature has been added to the site.

**News Editor** – Jennifer Davis reported on behalf of Ricky Fiorillo that news submissions are very low. He asked that the link structure of the web page be edited to make it easier to submit news for publication on the website and in *Southeastern Biology*.

**Membership Officer Report** – Deborah Atkinson's report was read into these Minutes. She reported that three members, I.W. Carpenter, Wayne R. Faircloth and Victor Rudis, passed away since the 2007 Annual Meeting. Two members, B. Allen Dunn and J. Kenneth Shull, Jr., seek Emeritus status. The number of members as of April 2008 was 1375, down from over 1600 members in 2006 and 2007.

### 3. Committee Reports

Conservation Committee – Chair Michael Woods' report was read into these Minutes. He shared that a list of 26 ASB members willing to serve on an ASB Conservation Sub-committee for their state was assembled. These members can speak to a variety of groups about state environmental and conservation issues.

Education Committee – Dennis Haney, Chair, reported that a lunch-time workshop, "Now What Do I Do? Career Options in Biology and How to Attain Them," was organized by the committee for the 2008 Annual Meeting.

Graduate Student Support Award Committee – Chair Steven Keenum's report was read into these Minutes. He stated that thirteen graduate students, all presenting the results of their research, received support to attend the 2008 Annual Meeting.

Local Arrangements & Program Committee – Joe Pollard reported that 691 people are registered for the 2008 Annual Meeting, 406 papers or posters are to be presented, and the largest number of commercial exhibitors in ASB's history is participating in this year's meeting. Dennis Haney added that a tremendous number of this year's abstracts, submitted as Microsoft Word document email attachments, had to be reformatted and stressed that online abstract submission is critical for future Annual Meeting Programs. Finally, they reported some difficulties with Leads online registration system that resulted in increased registrations by FAX or mail.

Nominating Committee – Dwayne Wise, Chair, and committee members assembled a list of nominees for open executive positions. Nominees for President-Elect are Patricia Cox and Terry Richardson. Elaine Davis and Dennis Haney are nominated for Vice-President, and Tim Atkinson is nominated for Treasurer. Four members, Ron Dimock, Christi Magrath, Paul Schmalzer, and Randall Small, are nominated for the two Executive Committee Members-at-Large positions.

Patron Member & Exhibitor Committee – Robert Wayne Van Devender, Chair, approached VWR and Olympus Microscopes about participating in this year's Annual Meeting.

Place of Meeting Committee – Don Roush reported that the committee considered several potential sites for the 2010, 2011, and 2012 meetings, including Asheville, North Carolina, Huntsville, Alabama, West Virginia, and coastal regions of North and South Carolina. Western Carolina University has agreed to host the meeting in 2010 in Asheville, North Carolina. The University of Alabama at Huntsville has been invited to host the meeting in 2011. There is interest in having the 2012 meeting, ASB's 75<sup>th</sup> anniversary, at the University of Georgia, Athens, where ASB was founded.

Don shared that meeting in off-campus convention centers and using a Meeting Coordinator has made it difficult to get Universities / Colleges to host an Annual Meeting. Discussion followed on the changing nature of the Association and our Annual Meetings and how past tradition of meeting on a college campus is no longer feasible. The following points were discussed –

1. The Place of Meeting Committee, together with Meeting Coordinator, Scott Jewel, needs to select a place of meeting that is popular with the membership.
2. ASB should maintain the tradition of having as many meeting venues as possible, instead of rotating among four or five sites.
3. Once a meeting venue is selected, the Place of Meeting Committee should invite regional universities and colleges to serve as host institutions.

Poster Award Committee – Chair Ray Williams' report was read into these Minutes. He reported that 44 posters qualified for the competition and all will be displayed on Thursday, April 17, 2008.

Publications Committee – Jennifer Davis, Chair, stated that the committee updated the Leadership Guide concerning the membership and responsibilities of the Publications Committee.

Senior Research Award Committee – Nitya Jacob, Chair, shared that two papers were submitted for the 2008 Senior Research Award. They unanimously agreed on the better of the two and the award will be announced at the Banquet.

Student Research Award Committee – Chair Frank Romano's report was read into these Minutes. He reported that papers were submitted for both the Student Research Award and the Aquatic Research Award. The committee considered all submissions and selected a recipient for each award. He did not share the number of papers submitted for each award.

Research Awards Committee (Microbiology) – Chair Min-Ken Liao's report was read into these Minutes. The committee received six abstracts of paper presentation from student authors to compete for this year's award.

Resolutions Committee – Kim Marie Tolson's report was read into these Minutes. She reported that the committee drafted a Resolution of Appreciation to the host institutions of the 2008 Annual Meeting.

Beta Beta Beta – Eighty posters and presentations will comprise the Beta Beta Beta sessions at the 2008 Annual Meeting. Doug Rayner acknowledged the tremendous help of the Beta Beta Beta members in organizing this year's meeting.

#### **4. New Business**

Communication – Nicole Turrill Welch, Secretary, proposed using WebCT, or other such web-based communication management tool, to organize Executive Committee email discussions. Pat Cox expressed concern Executive Committee members working for federal agencies would not be permitted to access such a site during work hours.

ASB Leadership Forum and Workshop – President Mike Dennis suggested the need for a session at the Annual Meeting where members interested in participating in our Association could learn more about becoming committee members or officers.

John Herr ASB Life Achievement Award – Mike Dennis urged that criteria and a selection protocol should be developed for this award soon.

There being no further business, President Mike Dennis thanked everyone for coming and adjourned the meeting at 5:22 pm.

Respectfully submitted,  
Nicole Turrill Welch, Secretary  
21 August 2008



Little River Canyon Falls at the Little River Canyon National Reserve. Site of Field Trip No. 5, De Kalb and Cherokee Counties, Alabama.

**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS  
EXECUTIVE COMMITTEE MEETING  
SATURDAY, 19 APRIL 2008  
SPARTANBURG, SOUTH CAROLINA**

ATTENDANCE: 21 individuals attended the meeting

<b>NAME</b>	<b>CAPACITY</b>
Tom Wentworth	President
Patricia Cox	President-Elect
Mike Dennis	Past President
Elaine Davis	Vice President
Nicole Turrill Welch	Secretary
Tim Atkinson	Treasurer
Don Roush	EC Member-at-Large
Doug Rayner	EC Member-at-Large
Katie Greenberg	EC Member-at-Large
Ron Dimock	EC Member-at-Large
Randy Small	EC Member-at-Large
John Herr	Archivist
James Caponetti	Print Editor
Terry Richardson	Membership Officer
Scott Jewell	Meeting Coordinator
Ginger Bayless	Meeting Planner
Joe Pollard	LAC 2008
Dennis Haney	LAC 2008
George Cline	LAC 2009
Ken Marion	LAC 2009
Virginia Martin	Beta Beta Beta

President Tom Wentworth called the meeting to order at 7:55 a.m. Mike Dennis, Past President, passed the gavel and President's portfolio to Tom.

### 1. Election Results

Election of Officers was held during the Business Meeting on Friday, April, 18, 2008, and the results were as follows:

President-Elect:	Patricia Cox	EC Member-at-Large:	Ron Dimock
Vice President:	Elaine Davis	EC Member-at-Large:	Randy Small
Treasurer:	Tim Atkinson		

### 2. Award Recipients

The following members were recognized with awards during the Banquet:

#### Association of Southeastern Biologists Awards:

- Student Travel Awards – Mary Johnson, Chris Rice, Nicole Hughes, Fern Perkins, Todd Egerton, Emily Gillespie, Justin Shafter, Jay F. Bolin, Rachel Schroeder, Staci Blecha, Elizabeth Evans, Justin James Geise, and James Moore

- Student Poster Award – Amory L. Jendrek (honorable mention to Evan A. Eskew)
- 2008 Research Awards
  - Microbiology Award – Mario Muscarella (Sponsored by Brooks/Cole Cengage Learning Publishing Company, Belmont, California)
  - Brooks/Cole Student Research Award in Aquatic Biology – Seven J. Price (Sponsored by Brooks/Cole Cengage Learning Publishing Company, Belmont, California)
  - Student Research Award – Tracey D. Tuberville (Sponsored by Martin Microscope Company, Easley, South Carolina)
- Senior Research Award – Kurt A. Buhlmann
- Meritorious Teaching Award – Dwayne A. Wise

#### Affiliate Society Awards:

- Botanical Society of America, Southeastern Section, Student Paper Award – Nicole M. Hughes
- Botanical Society of America Southeastern Section Student Poster Award – Nicole M. Hughes
- Ecological Society of America, Southeastern Chapter, Eugene P. Odum Award – Tracey D. Tuberville (honorable mention to Nicole M. Hughes and Shannon Pittman)
- Ecological Society of America, Southeastern Chapter, Elsie Quarterman – Catherine Kieve Award – Nicole M. Hughes
- The North Carolina Botanical Garden Award – Katherine F. Weeks
- The South Carolina Herbarium Award – Jeff Brannon and Will Cely
- Society of Wetland Scientists, South Atlantic Chapter, Student Travel Awards – Charlotte K. Stellman, Evan A. Eskew, Grant M. Connette, Staci B. Blecha, and Masamichi Ogasawara
- Southern Appalachian Botanical Society, Elizabeth Ann Bartholomew Award – Michael Baranski
- Southern Appalachian Botanical Society, Richard and Minnie Windler Award – Aaron H. Kennedy and Gary L. Walker
- Southern Appalachian Botanical Society, Earl Core Student Awards – Juan Carlos Villarreral, Alexandra Kay, Louis Mansfield, and Michael W. Denslow
- Beta Beta Beta Biological Society, Southeastern District Awards, District I Brooks Paper Award – Andrea M. Cross
- Beta Beta Beta Biological Society, Southeastern District Awards, District II Brooks Paper Award – Karen Burwinkel
- Beta Beta Beta Biological Society, Southeastern District Awards, District I & II Brooks Paper Award – Jena Gladden
- Beta Beta Beta Biological Society, Southeastern District Awards, District I Johnson Poster Award – John Santiago
- Beta Beta Beta Biological Society, Southeastern District Awards, District II Johnson Poster Award – Sara Jackson

### **3. Officer Reports**

**President** – Tom Wentworth quoted Theodosius Dobzhansky, “Nothing in biology makes sense except in the light of evolution,” and declared the coming year, the 200<sup>th</sup> anniversary of Charles Darwin’s birth and the 150<sup>th</sup> anniversary of

the publication of *On the Origin of Species by Means of Natural Selection*, as the year of Charles Darwin. He suggested that some articles in *Southeastern Biology* and a variety of sessions at the 2009 Annual Meeting have an evolutionary theme. An ad-hoc committee consisting of Tom Wentworth, Jim Costa, Robert George, the Education Committee, and our new affiliate, the National Association of Biology Teachers, will be engaged in planning the year's events.

Tom also thanked the 2008 Local Arrangement Committee for all of their hard work that led to a very successful Annual Meeting, and he encouraged them to share their advice with the 2009 Local Arrangements Committee.

**Past President** – Mike Dennis attended the Past Presidents Breakfast and reported that the Past Presidents Council remains concerned about the lack of a Past President's Address at the Banquet. Tom Wentworth suggested that the 2009 Local Arrangements Committee consider making the Past President's address a separate session during the meeting.

**Membership Officer** – Terry Richardson asked the Executive Committee to clarify his duties in this new office. Tom Wentworth charged the committee that drafted the proposal for the two new offices, Membership Officer and Database Manager, to meet with the new officers, Terry Richardson and Deborah Atkinson, and bring details to the Interim Meeting in September. Discussion followed with key points regarding Terry's duties being (1) a review of who our members are, and who are not, and (2) a survey of the current membership.

**Archivist** – John Herr discussed the evolving nature of the Leadership Guide and asked all members of the Executive Committee to read the Guide and send any edits, corrections, or additions to the Secretary. The Secretary will update the Leadership Guide once or twice a year, most likely around the times of the annual and interim meetings of the Executive Committee. Mike Dennis asked that the chronology of revisions be recorded.

**Web Editor** – Mike Dennis conveyed details of his discussion with Dwayne Wise, Web Editor, regarding the addition of a link to the web site to better submit news and other info to *Southeastern Biology*.

#### 4. Committee Reports

Education Committee – Don Roush reported that the "Now What Do I Do? Career Options in Biology and How to Attain Them" event was extremely well attended and deemed a success. This event was held on Thursday, April 17, 2008, from 12:00 noon to 1:30 p.m., and lunch was provided for the participants. Participants included undergraduate and graduate students, and they learned about career options available to them as they approach graduation.

Local Arrangements Committee 2008 – Joe Pollard shared details of our successful Annual Meeting. He reported that 832 individuals registered for the Annual Meeting and 295 attended the Wednesday evening Plenary Session by Dr. William Schlesinger. Attendance of the Thursday night social was 483, and 306 members enjoyed the Friday Banquet. Eighty-seven individuals participated in workshops and 68 took field trips. Joe explained that having the abstract deadline in early January worked well, and acknowledged the work of Dennis Haney, Program Chair. The number of paper/poster no-shows (3) and

cancellations (11) were much fewer than last year. Business Meeting attendance, however, was low, perhaps because of little time between the last paper in the morning sessions and the beginning of the Business Meeting. Joe recommended including an explanation that all members should attend the Business Meeting in the 2009 registration packet. Also to aid the election process, the Past President should assign and coordinate tellers at the Business Meeting. Tom Wentworth charged this committee to update the Local Arrangements Committee duties in the Leadership Guide.

Motion 1. Tom Wentworth moved that we express the Executive Committee's appreciation for the hard work that the Local Arrangements Committee 2008 invested in this meeting. Mike Dennis seconded and the motion passed.

Local Arrangements Committee 2009 – George Cline and Ken Marion distributed a list of the Local Arrangements Committee members, representing four host institutions in the Birmingham, Alabama region. They shared ideas for potential field trips and activities. The Committee will send invitations to institutions in the Birmingham area that traditionally do not attend, or have not attended, the Annual Meeting in several years. Online submission of abstracts will not be available for the 2009 Annual Meeting, but efforts are underway to have this service in 2010. Better access to award descriptions on the ASB website and improved means to distribute nominee abstracts to award committee chairs were discussed.

Meritorious Teaching Award Committee – Ron Dimock reminded the Executive Committee to update the description of this award to reflect the 10-year membership requirement of nominees.

Place of Meeting Committee – Tim Atkinson and Scott Jewell reiterated that the Executive Committee must update the model for selecting meeting sites, as the current method leaves us a year behind. Scott stressed that we should have 2011 and 2012 locations signed by the 2009 Annual Meeting.

Poster Awards Committee – Ray Williams conveyed suggestions that the Poster Award have two categories, undergraduate and graduate, and that this committee continue to consist of five members. These issues were discussed and the Executive Committee considered that, at this time, there is no need for any action on these matters.

Research Award (Microbiology) Committee – Don Roush reported that this award, formerly funded by Thompson Brooks Cole, becomes an ASB Award since Brooks/Cole Cengage Learning is no longer publishing the microbiology textbook tied to this award.

## **5. Affiliate Reports**

Beta Beta Beta – Don Roush reported that 47 posters and 30 papers were presented by the students and that many chapters attended the Annual Meeting. Tim Atkinson asked Don Roush and Virginia Martin to communicate to the advisors that Beta Beta Beta students must pay for their registration for the Annual Meeting. This year, numerous students arrived unregistered and unprepared to pay registration fees. The Executive Committee appreciates that

many Beta Beta Beta students traditionally attend only the Friday sessions of the Annual Meeting and want to pay a lower rate. However, the Executive Committee feels that the Beta Beta Beta students should attend more of the Annual Meeting and, thereby, receive the benefits of their registration fees.

National Association of Biology Teachers – Mike Dennis will write a letter welcoming this vital group as a new affiliate. Scott Jewell will attend their October convention in Memphis, Tennessee, and recruit members to ASB. We discussed our failure to recognize the NABT South Carolina Teacher of the Year at the Annual Meeting and the task of inviting the NABT Alabama Teacher of the Year to the 2009 Annual Meeting was assigned to the Chair of the Enrichment Fund Committee.

## 6. Old Business

Symposia Guidelines – Scott Franklin's revisions of the symposia proposal guidelines need to be posted on the ASB website and published in July 2008 issue of *Southeastern Biology*.

Invited Papers for *Southeastern Biology* – There should be one invited paper published each year in *Southeastern Biology*.

## 7. New Business

Date of Interim Executive Committee Meeting – on Saturday, September 6, 2008, the Executive Committee will meet in Asheville, North Carolina, the location of the 2010 Annual Meeting.

Enrichment Fund – President Tom Wentworth charged the Finance Committee to bring to the Interim Meeting recommendations on changing the dues structure, and to examine the Bylaws that require the membership to vote on proposed changes in dues structure. He also stressed the necessity to increase the Enrichment Fund. Specifically, he suggested that ASB needs (1) a champion to spearhead the effort, (2) consistency in the way we advertise and collect funds, and (3) to approach the business community for donations.

Emeritus Members – President-Elect Pat Cox shared that several Emeritus Members have stopped coming to Annual Meetings due to their increased cost. She proposed that the Emeritus Members be allowed to register for the meeting, banquets, etc., at the student rate. Tom Wentworth asked the Member Benefits Committee to consider this suggestion. Scott Jewell volunteered to be Chair of this committee.

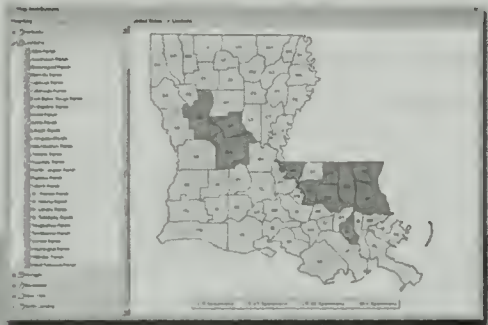
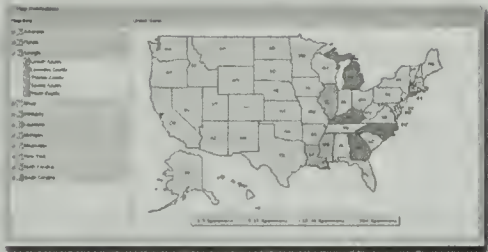
There being no further business, the meeting adjourned at 11:39 a.m.

Respectfully submitted,  
Nicole Turrill Welch, Secretary  
22 August 2008

# Silver BIOLOGY

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## Silver COLLECTION

Web Portal Software for Biological & Natural History Collections

Search Specimen DB

Filters

Family: Asteraceae

Genus:

Species:

State:

Parish/County:

Locality:

Collector:

Catalog #:

Catalog #

Family

Genus

Species

State

Parish/County

Locality

Family: Asteraceae (100 Specimens)

17429	Asteraceae	Achillea	millefolium	Louisiana	Assumption Parish	Paincourtville
17430				Louisiana	Bienville Parish	unspecified
17431				Louisiana	East Baton Rouge Parish	Baton Rouge
17432				Louisiana	East Baton Rouge Parish	Plains
17433				Louisiana	East Feliciana Parish	Clinton
17434				Louisiana	Lincoln Parish	unspecified
17435				Louisiana	Morehouse Parish	Bonita
17436				Louisiana	St. Helena Parish	Greensburg
17437				Louisiana	St. Helena Parish	Greensburg
17438				Louisiana	St. Helena Parish	Greensburg
17439				Louisiana	Vernon Parish	Leesville
15907				Louisiana	East Baton Rouge Parish	Ben Hur Woods
27784				Louisiana	St. Martin Parish	Cypress Island Preserv
13268				Louisiana	Ascension Parish	Brittany
13269	Asteraceae	Ageratina	altissima	Louisiana	Ascension Parish	New River

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## INVITED RESEARCH PAPER

### ***Tree Canopy Biodiversity in Temperate Forests: Exploring Islands in the Sky***

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**Key words:** All Taxa Biodiversity Inventory, corticolous myxomycetes, cryptogams, Daniel Boone National Forest, Discover Life in America, Great Smoky Mountains National Park, Pertle Springs, Missouri, species biodiversity, tree canopy climbing

"Trees are wild perennial plants that give us beautiful forest landscapes and challenges to explore the treetops for unknown species biodiversity". *Anonymous*

#### **The early years: a flatlander from Kansas**

My formative early years in the 1940's and 1950's were spent in the rural community of Peabody, Kansas that I still call home today (HWK). This is tallgrass prairie country located in central Kansas on the edge of the Flint Hills. I enjoyed hunting, fishing, and outdoor activities with my friends and family but had no interest in biology or becoming a scientist. Our family had business interests that included clothing stores, farming, and ranching. I spent most of my time working in our clothing store (men's and boy's wear) selling brand name merchandise and making extra money with my shoeshine stand. I spent summers doing farm work using tractors to plow, disc, duck-foot and chisel and drove a self propelled combine for custom cutting wheat and milo. I was also a "grease monkey" because these were still the days of grease zerts for moving parts of equipment, especially combines, which had to be properly greased every morning before the start of operation. Our trucking operations involved hauling cattle and swine with stock racks on the truck bed. Wheat and milo were hauled by truck to the nearest elevator or dumped on the ground using a hydraulic lift or corn silage taken to a conveyor and blown into a silo. My parents taught me hard work, honesty, and doing my chores were life lessons that would make a positive difference and a better person.

#### **The Lolo National Forest in Idaho: becoming a botanist and mycologist**

I (HWK) planned to major in Business Administration at Kansas Wesleyan University (KWU) but my father died my freshman year at the age of 44 of a brain tumor. My life floundered without any sense of direction or self confidence. I applied for a job with the United States Forest Service and was hired to work as part of a trail crew in the Lolo National Forest (this area is now part of the Clearwater National Forest) assigned to the Powell Ranger District (Headquarters at Powell Ranger Station). This location is also noteworthy because it is near Powell Ranger Station along the Lochsa River where members

of the Lewis and Clark Expedition suffered from the winter hardships and lack of game at their campsite September 14, 1805 and today a sign records their presence with these words "compelled to kill a Colt...for the want of meat..." (Moore 1996).

The first summer during June 1958 I was part of a trail crew clearing trails along the road to Elk Summit Guard Station. Snow was still on the road and trees blocked the roadway and off-road trails. We used a crosscut and chain saw, a double bitted axe, and a Pulaski to clear mostly tree debris from the roads and trails. We had to wear silver hard hats for safety reasons and I wrote KANSAS in big black letters on the front. Nobody wanted to climb trees to re-splice and re-hang the telephone line so Lennie Smith our foreman asked me to do it. I did not tell him that I was afraid of heights and sometimes got vertigo but I said, "okay, I'll give it a try."

The telephone line often was broken and had to be re-pliced and re-hung 6.1 to 12.2 m off the ground. Our climbing gear consisted of a belt that was worn buckled around the waist and climbing spurs/gaffs strapped and buckled to the inside of the legs and around the instep of heavy boots. *Pinus contorta* Douglas ex Loudon (lodge pole pine) was the tree usually used for hanging the telephone line. It had a straight trunk with few branches until about 6.1 m and relatively thin bark that spurs can easily penetrate. This type of climbing gear is often used by professional arborists, telephone pole climbers, and loggers. The puncture wounds from climbing spurs often resulted in sticky, resin droplets that exuded from the thin bark and covered the climber's shirt and pants. This climbing method is not allowed in our national parks today.

The first summer I trained at Nine Mile Ranger Station north of Missoula, Montana where I learned to run a compass course to locate smoke and use an azimuth to record lightning strikes and fires. Most of the snow had melted at higher elevations by the first or second week of July and lookout observers were assigned to different locations. Bear Mountain lookout tower was elevated approximately 15.2 m above ground level anchored by poles and guy wires. It commanded a panoramic view of the area. I was assigned to Diablo Mountain Fire Lookout that was a cabin on the ground at the edge of a precipice but commanded a view to the east to Missoula, Montana, to the south through Blodgett Pass, and to the west a panoramic view of the Selway-Bitterroot Primitive (Wilderness) area. Norman Maclean's book, *A River Runs Through It*, made into a popular motion picture, mentions this area and indeed he spent time at Elk Summit Guard Station and in the Bitterroot Mountains. This wilderness area has no passable roads and effectively has blocked any North-South highway through the central part of Idaho (Moore 1996). I was assigned to Diablo Mountain Lookout at an elevation of approximately 2,274 m. The steep trail to Diablo Mountain had many switchbacks the last few miles hence the name Diablo in Spanish means devil. I stayed at Diablo Lookout for about two months spotting fires and recording lightning strikes. The second summer I was part of a trail crew building the Skyline Trail using dynamite to clear the area for a foot trail. We also were a smoke-chasing team that was on-call to fight fire in the area. Our home base was Elk Summit Guard Station. Hoo Doo Lake was a short 0.4 k hike and it was easy to catch native cut-throat trout, rainbow trout, and eastern brook trout fly fishing or with daredevil spoons. We could catch breakfast or supper in a short period of time.

These two summers of 1958 and 1959 spent in the Bitterroot Mountains and working for the forest service in the Lolo National Forest kindled my interest in forestry. About this same time I met Professor Albert Robinson, Jr. at KWU and took botany and mycology courses from him. My grades improved and my interest in plants was sparked by his encouragement that I go to graduate school at the University of Kansas and work with Professor Ronald L. McGregor, head of the Department of Botany. He wrote a letter of recommendation that resulted in my being selected as a graduate student teaching assistant in the General Botany laboratory classes. His confidence and support over the years made the difference in my success that led to a career path in science.

My research mentor and doctoral dissertation advisor at The University of Iowa (1967–1971) was Professor George W. Martin who instilled in me the passion to learn more about the taxonomy of the myxomycetes through his scholarly example. His journal papers and books published on the Myxomycetes (true or plasmodial slime molds) and Tremellales (the jelly fungi) set the highest standards of scholarship. His last book, a world monograph entitled *The Myxomycetes*, published in 1969 with C. J. Alexopoulos, is still considered the most authoritative work on the subject. This book and his lifelong work on the Myxomycetes were cited as the basis for the Henry Allan Gleason Award given in 1970 to Professor Martin by the New York Botanical Garden for an outstanding recent publication in the fields of plant taxonomy, plant ecology, or plant geography. Professor Martin was referred to as “The Boss” by many of his earlier students, but I just could not bring myself to do that since I considered him my second father. He presented me an autographed copy of his world monograph *The Myxomycetes* with this notation: “To Harold Keller, my last student, with sincere regard, and the hope that he will do much to improve this treatment.” This began my career as a myxomycologist.

### **Corticolous Myxomycetes, Cemeteries, and Red Cedars**

Corticolous myxomycetes represent a group of species that are adapted to complete their life cycle only on the bark surface of living trees and vines. Most species that form fruiting bodies on living trees are tiny, less than 1mm, and difficult to see. The fruiting bodies form microscopic spores that survive in a dormant stage for many years. The spores germinate into microscopic motile stages such as myxamoebae that require moist conditions and/or flagellated, swimming swarm cells that require a thin film of water. These haploid motile stages encyst into a microscopic dormant stage called a microcyst. The diploid plasmodial stage may be microscopic or several centimeters or sometimes several meters large, brightly colored, and may form a dormant, usually visible stage called a sclerotium that survives unfavorable environmental conditions (Keller and Braun 1999, Everhart and Keller 2008). Other myxomycete species complete their life cycle on ground sites such as decaying logs and leaf litter in temperate and tropical forested areas, high mountainous regions under snow-banks, grasslands, semi-arid desert areas on decaying xerophytic plants, and usually associated specifically with these habitats and substrata when adequate moisture is present. These myxomycete species usually form larger fruiting bodies in greater numbers covering a wider area and are more conspicuous to the unaided eye (Keller and Braun 1999, Everhart and Keller 2008).

Credit must go to Dr. Travis E. Brooks who acquired in the 1960's special field knowledge such as the time of year, rainfall, temperatures, and species of

tree to locate and collect the corticolous myxomycetes (Keller 1979). He shared his collecting field experiences and observations with me suggesting that the living Eastern Red Cedar tree, *J. virginiana*, was one of the most productive trees in species richness of corticolous myxomycetes (Keller 1996, Keller and Braun 1999).

Cemeteries located throughout the central and southeastern United States of America often had *J. virginiana* trees, sometimes to the exclusion of other tree species. Apparently *J. virginiana* was planted near gravesites because it was readily available as a native tree species, it grew well in open field areas in full sun, and symbolically was considered the "death tree" (Keller and Braun 1999). Field forays for corticolous myxomycetes in the states of Alabama, Florida, Georgia, Kansas, Kentucky, Ohio, Oklahoma, Tennessee, and Texas were often at cemetery sites with *J. virginiana* trees. Much more time was spent collecting in Ohio, Florida, Kansas, and Kentucky in approximately that order. How did we locate cemeteries with red cedars? Smaller communities and towns usually had some older person on the main street that when asked the question about the location of old cemeteries would give directions to one or two cemeteries within the city limits and also near churches in the surrounding rural areas. Cities with larger populations and more urban sprawl required using the yellow pages of the telephone directory and looking under cemeteries to get the exact street address.

Ideal conditions of a soaking rain, cloudy weather that keeps the bark of living red cedars moist for several days, and warm summer temperatures generally from mid June to the end of September, resulted in myxomycete fruiting bodies that were collected at 1.5 to 1.8 m on the bark surface of trunks. My first experience collecting from *J. virginiana* trees was while I was in residence (1971-72) at the University of Florida, Gainesville on a Postdoctoral Fellowship awarded by the Graduate School based on a nationwide competition. My project proposal was to study Myxomycetes throughout the state of Florida and to do transmission and scanning electron microscopic studies with Professor Henry C. Aldrich in the Department of Botany and correlate ultrastructure with myxomycete taxonomic problems. Evergreen Cemetery, located within the city limits of Gainesville, was at 401 SE 21st Avenue, a short drive from the University. The first myxomycete collections were made July 28, 1971 and the last collections November 21, 1971 and the next year the earliest collections were made June 24, 1972. Species of myxomycetes developed fruiting bodies much later in the year than farther north (HWK per. obs.) apparently due to the warmer temperatures in this region of north central Florida. This part of Florida is north of the frost free zone evidenced by several hard freezes approximately -6.7°C. *Juniperus virginiana* trees were numbered (more than 200) to pinpoint the location of myxomycete species that occurred on each tree. The majority of the trees were *J. virginiana* with only a few pines that lined the roadway from the main entrance. The first paper published in a series of related papers on corticolous myxomycetes (Keller and Brooks 1973) cites collections of *Didymium orthonemata* H.W. Keller & T. E. Brooks on 20 *J. virginiana* trees (sometimes referred to as *J. silicicola* (Small) Bailey supposedly a southern species).

The history of the Evergreen Cemetery in part accounts for the great number of *J. virginiana* trees on the grounds. The first grave plot recorded in February of 1856 was near a young *J. virginiana* tree (Dr. Thomas H. Fay pers. comm.). Many red cedar trees were planted since then but wind storms and prolonged drought conditions have taken their toll on the number of these majestic old trees

(Fig. 1). Two myxomycete species developed extensive and conspicuous fruiting bodies visible to the unaided eye, for example, the sessile, white, mostly plasmodiocarpous habit of *Didymium orthonemata* and the brownish, stalked, clustered sporangia of *Stemonitis flavogenita* E. Jahn on 19 *J. virginiana* trees. These two species could be seen from ground level fruiting at higher points in the tree canopy. Several *J. virginiana* trees were climbed free-handed using the lower horizontal branches to follow myxomycete species that had fruited along the trunk axis vertically higher in the treetop. Other tiny species of the genus *Licea* were abundant in the tree canopy, for example. *Licea denudescens* H.W. Keller & T.E. Brooks was a species described new to science with the holotype locality in Evergreen Cemetery (Keller and Brooks 1977).



FIG 1. Photograph of *Juniperus virginiana* at Evergreen Cemetery, Gainesville, Florida, October, 2008.

Field observations of *Arcyria cinerea* occurred on many of the *J. virginiana* trees in Evergreen Cemetery but only a few collections were made because of the widely scattered and solitary habit. Sporangia on living trees were the typical single, stalked sporangium in contrast to the more gregarious habit and digitate form that develops extensive fruiting bodies found on decaying wood or logs on ground sites (pers. obs. HWK).

A list was compiled from mostly field-collected myxomycete species on the bark surface of living *J. virginiana* trees and also harvested from moist chamber bark cultures. This species list (Table 1) was made over a period of at least 35 years and multiple trees (approximately 250 trees). There was at least one species (a spiny reticulate-spored *Stemonitis*) found on many trees in Florida's Evergreen Cemetery that is still unidentified. Bark from most of these trees was collected at a height of 1.5 to 2 m. One species, *Diachea arboricola*, was collected only from the tree canopy above 2 m. Taxa are arranged alphabetically by order and genus and nomenclature generally follows Martin and Alexopoulos (1969).

Table 1

Myxomycete species from multiple trees of living *Juniperus virginiana* (Eastern Red Cedar) organized by taxonomic orders

Order Echinosteliales

*Echinostelium arboreum* H.W. Keller & T.E. Brooks +, *E. coelocephalum* T.E. Brooks & H.W. Keller +, *E. elachiston* Alexop.+, *E. fragile* Nann.-Bremek.+, *E. minutum* de Bary+, *Clastoderma debaryanum* A. Blytt var. *emperatorium* Emoto+, *C. microcarpum* (Meyl.) Kowalski+, *C. pachypus* Nann.-Bremek.+ (8 taxa).

Order Liceales

*Licea biforis* Morgan\*, *L. denudescens* H.W. Keller & T.E. Brooks\*, *L. inconspicua* T.E. Brooks & H.W. Keller\*, *L. kleistobolus* G.W. Martin\*, *L. nannengae* Pando & Lado\*, *L. operculata* (Wingate) G.W. Martin\*, *L. parasitica* (Zukal) G.W. Martin\*, *L. pedicellata* (H.C. Gilbert) H.C. Gilbert\* , *L. perexigua* T.E. Brooks & H.W. Keller\*, *L. pseudoconica* T.E. Brooks & H.W. Keller\*, *L. scyphoides* T.E. Brooks & H.W. Keller\*, *Licea* sp.\* (unidentified and unnamed); *Cribraria minutissima* Schwein.\*, *C. violacea* Rex\*, *Dictydiaethalium plumbeum* (Schumach.) Rostaf.\*, (15 taxa).

Order Physarales

*Badhamia affinis* Rostf.\*, *Badhamia rugulosa* T.E. Brooks & H.W. Keller\*, *Badhamiopsis ainoae* (Yamash.) T.E. Brooks and H.W. Keller\*, *Diachea arboricola* H.W. Keller & M. Skrabal\*, *Diderma corrugatum* T.E. Brooks & H.W. Keller\*, *D. chondrioderma* (de Bary & Rostaf.) G. Lister\*, *Didymium clavus* (Alb. & Schwein) Rabenh.\*, *D. orthonemata*, *D. synsporon* T.E. Brooks & H.W. Keller\*, *Physarum aeneum* (Lister) R.E. Fr.+, *P. auriscalpium* Cooke\*, *P. crateriforme* Petch\*, *P. nutans* Pers.\*, *P. synsporum* S. L. Stephenson & Nann.-Bremek.\* (should be reassigned to the genus *Badhamia*), *Trabrooksia applanata* H.W. Keller\*(15 taxa).

Order Stemonitales

*Comatricha* cf. *laxa* Rostaf.\*, *Macbrideola cornea* (G. Lister & Cran) Alexop.\*, *M. declinata* T.E. Brooks & H.W. Keller\*, *M. decapillata* H.C. Gilbert\*, *M. scintillans* H.C. Gilbert+, *Stemonitis flavogenita* E. Jahn\*, *Stemonitis* sp.\* (unidentified and unnamed with spiny-reticulate spores) (7 taxa).

Order Trichiales

*Arcyria cinerea* (Bull.) Pers.\*, *Dianema* sp. (unidentified and unnamed)\*, *Calomyxa metallica* (Berk.) Nieuwl.\*, *Minakatella longifila* G. Lister\*, *Perichaena chrysosperma* (Curr.) Lister\*, *P. depressa* Lib.\*, *P. minor* (G. Lister) Hagelst. var. *minor*\*, *P. minor* var. *pardina* (Minakata) Hagelst.\*, *Trichia* cf *contorta* (Ditmar) Rostaf.\* (9 taxa).

Total number of different myxomycete taxa from bark of living *J. virginiana* trees=54

\*field collections from living trees and + specimens harvested from moist chamber bark cultures

The data in Table 1 suggests that *J. virginiana* represents a tree species with unusually high species diversity of myxomycetes. There are several reasons that this may be a subject to question. For example, comparing the data in Table 1 with data from Everhart et al. (2008), who sampled primarily from GSMNP and the Daniel Boone National Forest (DBNF) in Kentucky, show that collections from

*J. virginiana* were from a larger geographic region. Second, the collections from *J. virginiana* were from approximately 250 individual trees, whereas the species-area curve represents 60 individual trees sampled (Figure 3). Third, samples from *J. virginiana* were taken from multiple localities that were not in the same habitat type, including parks and urban areas in different states.

There are several possibilities why *J. virginiana* has such high myxomycete species diversity. Records from *J. virginiana* are largely from field collections which are an underestimation of the total number of species, since many species remain dormant, developing fruiting bodies only under optimal conditions (such as in moist chamber cultures) for a very brief period of time and are fragile and easily destroyed. In addition, many species are rarely observed as field collections because their fruiting bodies are extremely tiny, less than 1 mm, and only visible with directed light from a dissecting microscope (Keller and Braun 1999, Everhart et al. 2008). Therefore, the total number of species based largely on field observations may be an underestimation, suggesting *J. virginiana* has even more species than those listed here. *Juniperus virginiana* has a bark pH that is nearly neutral (Table 2) and therefore is able to host myxomycete species that are pH generalists and marginally support both acidophilic and basophilic species. This near neutral pH would therefore optimize myxomycete species diversity.

Macroscopic characteristics of the bark, tree architecture, and environmental conditions would also favor high myxomycete species diversity. The bark is spongy and highly water absorbent and the lower trunk of the tree is usually exposed with the branching beginning at approximately 1/3 of the total height of the tree. With the lower portion of the tree trunk exposed, rain would readily soak the highly water-absorbent bark of the tree. *Juniperus virginiana* is also commonly planted in cemeteries and invades open field habitats (it is not shade tolerant and only occurs at the margins of forested areas), therefore windblown spores of myxomycetes would more readily adhere to the bark surface and complete the life cycle. Thus, after a rain, high air temperatures and high moisture content would favor myxomycete growth on the exposed trunks of *J. virginiana*. Fewer myxomycetes would develop under a dense forest canopy which would not warm as quickly and retain humidity on the tree trunks – two factors which decrease myxomycete development and maturation. These environmental factors associated with *J. virginiana* trees would appear to select and favor the rapid development of mature myxomycete fruiting bodies under natural conditions. This rapid cycle of myxomycete development and sporulation, often between 24 to 72 hours, would reduce competition in the plasmodial phase thus providing more niche space for many more corticolous species (Everhart and Keller 2008).

### **Tree Canopy Biodiversity in the Great Smoky Mountains National Park**

A grant proposal to the National Science Foundation Small Grant for Exploratory Research through the Biodiversity Surveys and Inventories Program was based on the application of a new approach to explore the tree canopy for cryptogams (myxomycetes, macrofungi, mosses, liverworts, lichens, and ferns) using rope climbing methods. The seminal idea was based on previous experiences using free hand climbing methods exploring and collecting myxomycetes vertically along the trunks of living *J. virginiana* trees. The

cryptogams were in the tree canopy so we utilized the best and safest way to climb the tree to gather samples along vertical transects.

The Doubled Rope Climbing Method (DRCM) was used in this project because it was more of a noninvasive method and would minimize any injury to trees compared to the pole climbing spurs that were used in the past (Kilgore et al. 2008). Scientific Research and Collecting Permits issued by the United States Department of Interior National Park Service for the GSMNP required details about the climbing protocol that included collecting methods, safety precautions that ensured students were qualified tree climbers, and adequate preparation for any emergency situation. Safety precautions were always emphasized as a priority during the course of this tree canopy project. Fortunately Charly Pottorff, a professional arborist from Manhattan, Kansas, had a special interest in this project from the beginning and served as the instructor for our tree climbing schools held at Pertle Springs, Warrensburg, Missouri. His professional experience climbing champion-sized trees and certification of mastering the DRCM was invaluable when teaching the use of the Big Shot (an over-sized sling shot to get a throw line in the tree canopy), the basic knots used for the DRCM, the proper use of climbing saddles and safety lanyards, and the strength, agility, and advancing methods to reach 30 m or to the treetop. Details about the climbing school, the DRCM, and student research experiences (the Adventure Phase, Laboratory Phase, and Publications Phase), were described by Counts et al (2000), Keller (2004) and Kilgore et al. 2008. Additional papers that included how the sampling protocols and data were gathered for different tree species were discussed in Snell and Keller (2003), Snell et al. (2003), Keller (2004), Keller (2005), Everhart et al. (2008), and Kilgore (2008).

### **Influence of Bark pH on the Occurrence and Distribution of Tree Canopy Corticolous Myxomycetes**

The first tree canopy study that used the DRCM examined the vertical distribution of corticolous myxomycetes that grow and fruit on the bark surface of living trees, including any possible new species and new records in the GSMNP (Snell and Keller 2003). Bark samples were collected at 3.3 m increments, transported to the laboratory, and prepared in moist chamber cultures consisting of sterile, polystyrene, round, Petri dishes (150 X 25 mm). Each Petri dish was fitted with filter paper and the bark placed face up covering the bottom of the Petri dish. The bark was wetted with 35 mL of sterile, de-ionized water adjusted to a pH of 7. After 24 h excess water was decanted and pH was measured in three random places on the filter paper near or under bark pieces with an Orion model 610 flat probe pH meter. Moist chambers were cultured in ambient light and room temperature (23.-25 C.) These moist chamber cultures were scanned for myxomycetes on day 4, 8, 16, and 32. The scanning of bark cultures, recording species present, preparing voucher specimens, and identification was a time consuming process estimated to take 15 to 30 min per plate. This limited the number of moist chamber cultures that could be examined during a two years Master's Degree Program (420 cultures in Snell (2002), Snell and Keller (2003), 580 cultures in Everhart (2007), Everhart et al. (2008). Tree canopy myxomycetes were represented by 95 different species, including 52 new records for the Park based on 209 bark samples from 25 trees of 5 different tree species (Snell and Keller 2003, Snell et al. 2003). Since then 10 new myxomycete records from ground sites and two new records from the tree

canopy have been found with a total number of species for the Park approximately 220 (Keller 2004, Everhart et al. 2008). Although there was no relationship between species assemblages and height in the tree canopy, 30 myxomycete species or 32 %, were known only from the tree canopy and not found on ground sites (Keller 2004).

The use of Sørensen's coefficient of community index (CC) showed that the CC of *Pinus strobus* L. and *Fraxinus americana* L. were significantly different (Snell and Keller 2003) and these two tree species were at opposite ends of the pH scale (Table 2). Additional data showed that the community of myxomycetes was consistent among trees of the same species and was associated with bark pH. Five tree species were measured at diameter at breast height (d.b.h.-1.3 cm) and also for total height with a measuring tape carried by climbers. These five tree species were all a minimum of 27 m in total height and the range in d.b.h. was from 40 to 180 cm. The range in d.b.h. is given in cm with (parentheses) for each tree species *Acer rubrum* L. (40- 83), *Fraxinus americana* L. (52-104), *Liriodendron tulipifera* L. (80-180), *Pinus strobus* L. (69-91), and *Quercus alba* L. (51-90) in Snell and Keller (2003) are shown in Table 2. *Acer rubrum* had the highest species richness (Table 2) and mature plasmodiocarpous fruiting bodies of the myxomycete *Hemitrichia serpula* (Scop.) Rostaf. were obtained in the field on more flaky bark 20 m above ground level on the inner bark surface. This myxomycete typically is found on mixed leaf, twigs, small decaying limbs, and the underside of well decayed logs on ground sites. The canopy trees were preselected for their larger size and apparent older age as evidenced by bark characteristics, d.b.h., and total height, and also when combined with extremely wet conditions, that had resulted in typical ground site myxomycete species in the upper tree canopy (Snell and Keller 2003).

These results were substantiated with a follow-up study that examined 290 bark samples from 30 trees of 6 species and 30 grapevines of two species that neighbored these trees (Everhart et al. 2008). Thus, it was important to conduct large scale studies on the corticolous myxomycetes with many bark samples because the distribution of myxomycetes was not even and often patchy over bark surfaces of living trees. In addition, Everhart et al. (2008) showed that environmental factors changed bark pH and subsequently yielded a species assemblage of corticolous myxomycetes that was characteristic of different tree species that had similar pH. Further studies showed that different plant parts on the same gymnosperm tree (bark and cones) also yielded different pH values and different species assemblages (Kilgore 2008).

### **Tree Species pH with Associated Myxomycete Species Assemblages**

More than 500 trees have been climbed and sampled during the course of this project but not all were part of the moist chamber cultures and the pH measurements reported here. The mean and standard error were found by converting pH values on the logarithmic scale to linear scale hydrogen ion concentration. Once the mean hydrogen ion concentration was found, the value was converted back to the logarithmic pH value. In order to calculate standard error, the mean pH value had to be subtracted from the  $-\log [SE H^+]$ . This ensured that no rules were violated on calculating mean values from a logarithmic scale (Table 3).

Table 2

Summary of tree species for pH, moist chamber cultures, and number of myxomycete species.

Tree Species	No. of trees	pH ± SE	No. of cultures	No. of pH readings	Total myxo. sp.
<i>Picea rubens</i>	4	3.7 ± 0.05	32	69	10
<i>Pinus strobus</i>	5	3.8 ± 0.16	86	258	24
<i>Pinus echinata</i>	8	3.9 ± 0.88	170	680	14
<i>Abies fraseri</i>	4	4.1 ± 0.06	32	51	0
<i>Tsuga canadensis</i>	5	4.1 ± 0.08	50	200	17
<i>Acer rubrum</i>	5	4.7 ± 0.14	72	216	49
<i>Liriodendron tulipifera</i>	5	4.9 ± 0.22	90	270	39
<i>Platanus occidentalis</i>	5	5.1 ± 0.04	48	192	10
<i>Acer saccharum</i>	5	5.5 ± 0.05	46	138	17
<i>Quercus alba</i>	5	5.7 ± 0.46	82	246	41
<i>Liquidambar styraciflua</i>	5	5.8 ± 0.04	90	360	10
<i>Cercis canadensis</i>	4	6.3 ± 0.51	64	256	11
<i>Juniperus virginiana</i>	6	6.7 ± 0.09	50	177	50
<i>Fraxinus americana</i>	5	6.7 ± 0.16	86	258	31
Total 14	71	n/a	998	3371	n/a

Table 3

Summary of mean pH ranges and associated myxomycete species assemblages

Mean pH 3.7 – 4.1

*Cribraria confusa*, *C. rufa* (Roth) Rostaf., *C. ellae* Härk, *C. nigra* (Pers. ex J.F. Gmel.) J. Schröt., *Enerthenema papillatum* (Pers) Rostaf., *Physarum nutans*

Mean pH 4.2 – 5.8

*Badhamia rugulosa*, *Clastoderma debaryanum* A. Blytt, *Clastoderma pachypus*, *Comatricha acanthodes* Alexop., *Echinostelium coelocephalum*, *E. apitectum* K.D. Whitney, *Lamproderma biaspersorum* Kowalski, *Physarum crateriforme*,

Mean pH 5.9 – 7.0

*Badhamia affinis*, *Cribraria violacea*, *Diachea arboricola*, *Didymium clavus*, *Licea biforis*, *L. parasitica*, *Macbrideola cornea*, *M. decapillata*, *M. declinata*, *M. scintillans*, *Trabrooksia applanata*,

Mean pH 3.7 – 7.0

*Arcyria cinerea*, *Calomyxa metallica*, *Diderma chondrioderma*, *Echinostelium minutum*, *Licea kleistobolus*, *Perichanea chrysosperma*

Myxomycete species were placed with their respective tree hosts and were then grouped according to taxonomic order. The mean pH value for each group of host trees was calculated and these included the number of individual trees in (parentheses): *Abies fraseri* (4), *Cercis canadensis* (4), *Fraxinus americana* (10), *Juniperus virginiana* (6), *Liriodendron tulipifera* (10), *Pinus echinata* (8), *Picea rubens* (4), *Pinus strobus* (5), *Quercus alba* (5), and *Tsuga canadensis* (5) (Table 2 and Figure 2). The mean pH and standard error for the host trees of each species of myxomycetes was calculated and this was considered the mean pH range for that particular species of myxomycete. The myxomycetes were then grouped according to order with the number of different myxomycete taxa for each order: Liceales (21), Stemonitales (22), Physarales (32), Echinosteliales (9) - and the mean pH and standard error values were taken for a particular order.

Myxomycetes occur throughout a wide range of the pH scale (3.7 to 6.7) shown here for the tree canopy trees (Table 2) and even higher pH values for plants that occur in desert areas (Schnittler 2001) with a pH range of 7.3 to 8.7, mostly basophilic. Furthermore, plant substrata from arid areas in general ranges from a pH of 6.0 to 10.4. and pH of decomposing cactus debris had a high pH between 7.0 to 10.0 (Novozhilov et al 2006). Members of the myxomycete Order Stemonitales typically do not occur at these higher pH values and some species were restricted only to the lower pH values 3.7 to 4.1, and are therefore considered acidophilic (Table 2, 3). Examples of acidophilic myxomycete species in the Stemonitales are listed in Table 3.

The genus *Macbrideola* has been classified in the Order Stemonitales (Martin and Alexopoulos 1969, Keller and Braun 1999) without taxonomic controversy. In contrast, four species included in the genus *Macbrideola*, *M. cornea*, *M. decapillata*, *M. declinata*, and *M. scintillans* occur with great frequency on the bark of living canopy trees, *Fraxinus americana* and *Juniperus virginiana* (Snell and Keller 2003, Keller 2004, Everhart et al. 2008) and on shrubs in semiarid areas of New Mexico (Keller pers. obs.). This group of species occurs at the highest end of the pH scale (6.7) and obviously raised the pH values for the Order Stemonitales. Members of the genus *Macbrideola* have not been grown from spore to spore on agar culture nor has the plasmodium ever been observed as either a protoplasmodium or an aphanoplasmodium. The morphological characteristics exemplified by the translucent, hollow stalk without any enclosed debris seems out of place when compared to other taxa in the Order Stemonitales. Species of *Macbrideola* should be targeted for DNA analysis to determine their phylogenetic relationship to other genera such as *Stemonitis* and *Comatricha*.

Certain species of *Licea* and *Cribraria*, *C. confusa*, also show a trend toward a lower pH of 4.6 as does the Order Liceales (Fig. 2) but *Cribraria violacea* was found more frequently on the highest pH 6.7 trees (Table 1,2,3). Members of the Order Physarales exhibited a mean pH of 4.7, the Trichiales had a mean pH of 4.8, and the Echinosteliales had a mean pH of 4.9 (Fig. 3) which fall in the middle of the pH range. Most corticolous myxomycetes on the bark of living trees develop and form fruiting bodies mostly in the middle pH range of 4.2 to 5.8. Bark of all of these tree species (Table 2) was acidic with a pH of 3.7 to 6.7 (Table 2).

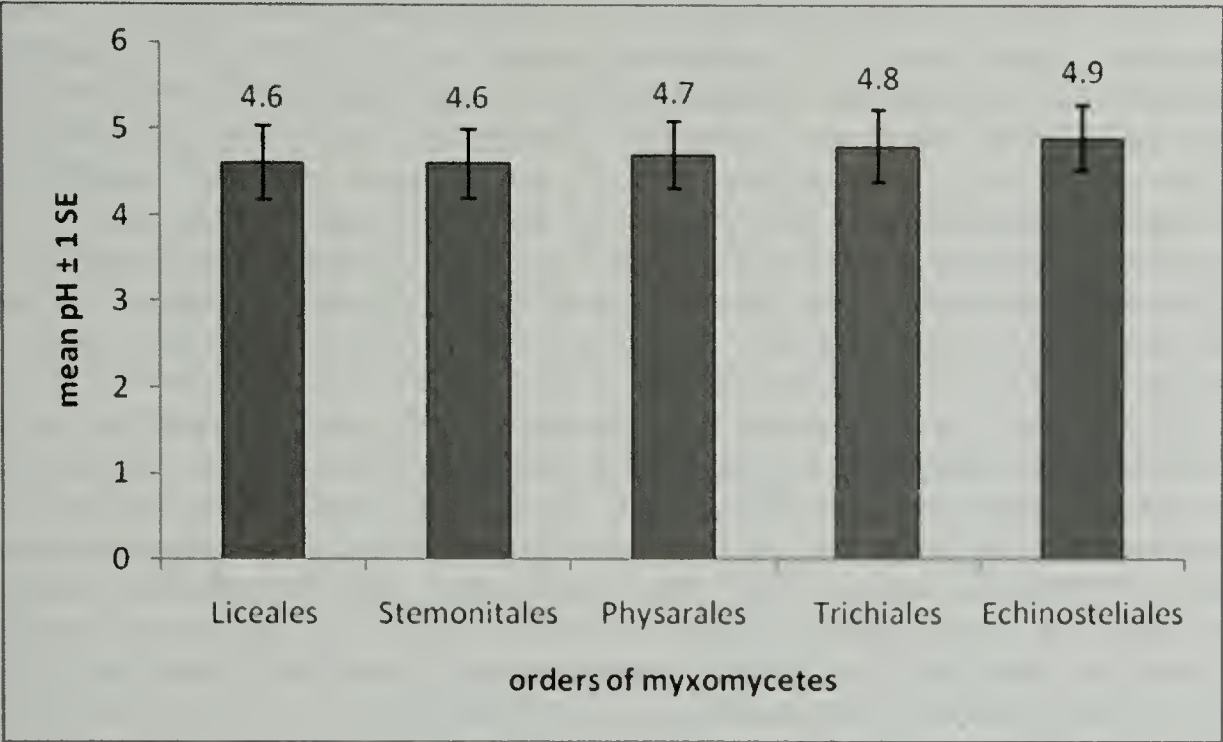


FIG. 2. Mean  $\pm$  standard error pH for Myxomycete species grouped by taxonomic order.

Species-area curves (also called species-accumulation curves) are used to evaluate the adequacy of sample size in a community data set. The upper curve represents the average number of species accumulated by the number of sample units surveyed, which is calculated by taking a random sub-sample of the dataset for any given number of sample units and repeated 500 times (Figure 2). The lower curve utilizes Sørensen's distance-based algorithm that calculates similarity between these sample units in a similar fashion as the upper curve.

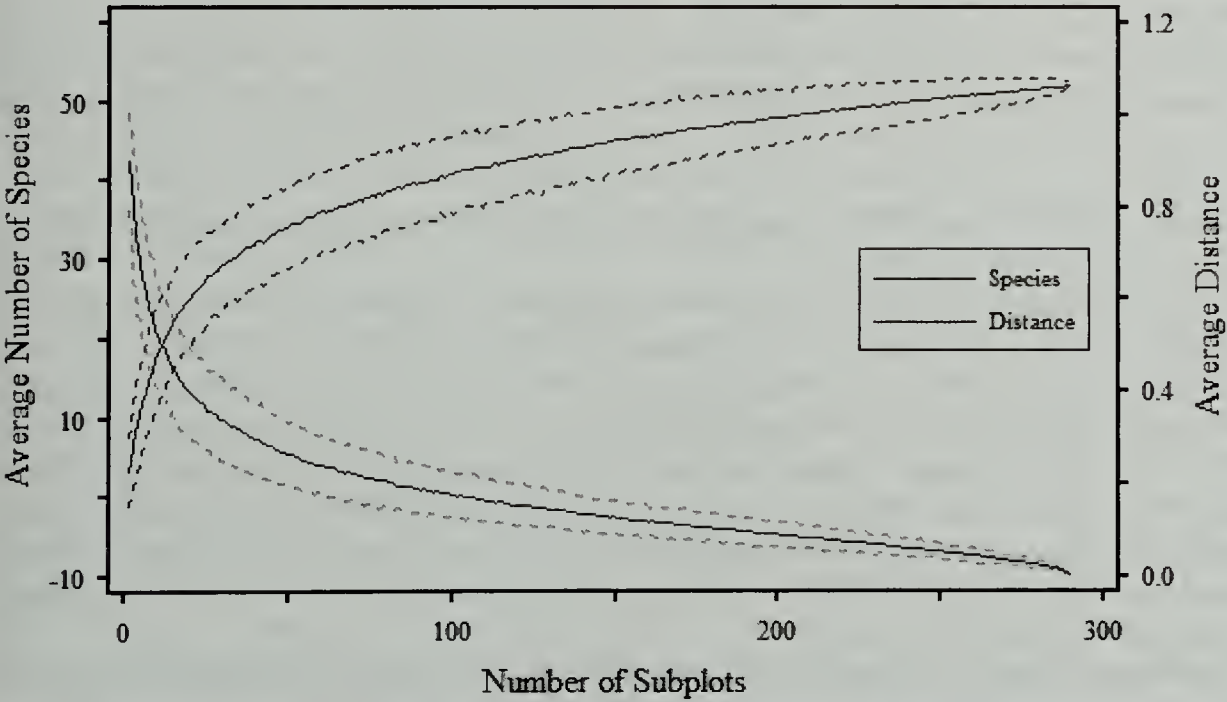


FIG. 3. Species-area curve showing accumulation of corticolous myxomycete species richness based on the number of subplots used, where 45 species are obtained at 50% sampling effort and 52 species accumulate at 100% sampling effort (290 bark samples, Everhart et al. 2008).

A species-area curve of 290 sample sites, constituting 6 tree species and 2 grapevine species, and 52 myxomycete species is shown in Figure 3 based on Everhart et al. (2008). Host species included five individuals of six tree species, *Acer saccharum*, *Fraxinus americana*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Platanus occidentalis* and *Tsuga canadensis*, and neighboring grapevines, *Vitis aestivalis* and *V. vulpina*. The list of myxomycete species can be found in Everhart et al. (2008). Each sample site represents the presence of a myxomycete species from two over-sized moist chamber cultures of bark sampled from a single height of 3, 6, 9, 12, or 15 m from all sides of the trunk or grapevine.

This species-area curve begins to plateau after 50 samples with 34 species found and was consistent with species-area curves generated for myxomycete species in temperate forests (Unterseher et al. 2008). Beyond 50 samples, 18 more species are found only after increasing the sample size by approximately six-fold. Therefore, sampling beyond 50 samples increases the total species found by 35%, sampling beyond 100 samples increases the species list by 21% (11 species), sampling beyond 150 increases the species list by 13% (7 species), and sampling beyond 200 species increased the species list by 8% (4 species). Total species richness for this dataset was estimated to be 63 species with a first-order jackknife and 69 species with a second-order jackknife procedure.

Large-scale studies of myxomycetes also aid in evaluating the role that species-specific and intra-specific relationships play in community composition. For example, previous studies have shown that there are species-specific associations between certain myxomycete species and perennial epiphytes, such as lichens, and bryophytes (Gray and Alexopoulos 1968, Ing 1994, Keller and Braun 1999, Novozhilov et al. 2000, Schnittler et al. 2000, Smith and Stephenson 2007). Nevertheless, examining community associations among all corticolous species and the presence of other epiphytes has yielded weak associations (Everhart 2007). These results demonstrate that the occurrences of myxomycetes are largely independent of other epiphytes. The majority of these large-scale projects have indicated that community partitioning of myxomycetes does not go far beyond associations with bark pH/tree species.

### **A New Tree Canopy Myxomycete Species: An Undergraduate Student's Perspective**

The personal narrative found in this topical section is by Melissa Skrabal entitled "My Eyes Opened and There It Was!" that described her field and laboratory discovery of a new myxomycete tree canopy species *Diachea arboricola* H.W. Keller & M. Skrabal (Keller 2004; Keller and Skrabal 2002; Keller et al. 2004). This new species apparently represents the first arboreal (upper canopy) myxomycete recorded to date and is only found in the Great Smoky Mountains National Park. This was part of an undergraduate student research project at UCM (Keller 2005). She graduated August, 2001 from UCM with *Magna Cum Laude* honors.

Melissa begins: I awoke to a morning dawn that could not have been more beautifully intense. Remembering that today was our first day to test the Big Shot my mood began to change for the best as I hustled around in my best attempt to prepare for the upcoming day. This Schwarznegger-sized tall slingshot (2.4 m) was supposed to help save time and effort for hoisting our throw line over the first crotch of a tree. Why throw ropes up into the trees you may be asking? This tree

canopy biodiversity research project was part of the All Taxa Biodiversity Inventory (ATBI) research project taking place in the Great Smoky Mountains National Park. This project was designed to record all of the living organisms in the Park. Our part of the ATBI project took place in the treetops which had never been explored before.

Each crew member greeted me as I elbowed my way through the crowded kitchen in order to get a measly bowl of cereal. Some of my fellow climbers "good mornings" were of high-pitched cheer while others were less enthusiastic. After ten days of this routine we had learned how to cut our preparation time down to a bare minimum. Our climbing gear remained packed in the vehicle from the last day's excursion so all the time left was to prepare our lunches. More comfortably packed than sardines, we crammed into the van and drove to our destination. Luckily the drive to Turkey Pen Ridge Trailhead was only about ten minutes from our Cades Cove house. Slowly getting out of the van the student climbers gave one last stretching effort to wake up and then unpacked our gear. We slung our seventy-pound gear bags onto our backs (each comprised of a harness, 36.6 m climbing rope, altitude line, gloves, and more) and began to hightail it up the trail. Buck Counts had the "Big Shot," tied onto his backpack in such a fashion that required a *WIDE LOAD* sign to be glued to his backside. Our ground crew loaded up their arms with logbooks, safety hats, and bug spray. Even though the trail was a fairly easy incline covered with small rocks and horse dung, the weight of our gear bags made the hike a more challenging jaunt.

Now fully awake, marginally from the shock of the crisp morning air, and mainly due to the sudden caffeine jolt thanks to the morning's coffee binge, the climbers happily shared gossip and jokes as if we were back in junior high. After hiking slightly more than a mile we came to a fork in the trail. We could not decide whether to stop and climb or continue on but most of us were impatiently itching to climb and test the "Big Shot". We stopped and scouted out the surrounding territory. Very unimpressed with the size of the trees, I was convinced that we would not have a very productive climb. I figured we would be up and down the trees in no time and with little accomplished due to their tiny sizes of approximately 30 m tall.

Breaking out the bright yellow Big Shot we gave it a test run on a white oak (*Quercus alba*). It worked marvelously. The job of precisely lassoing the first high branch of a tree (usually about 18 to 21 meters up) used to take 30 frustrating minutes using a hand throwing technique, but now it took only about five with the Big Shot. The throw line had never been hurled so accurately and gracefully in such record-breaking time. Selfishly hoping for a more robust tree, I harnessed up and secured the climbing line and grudgingly began the ritualistic climbing procedures. Coordinating all my body parts in a rhythmic upward motion and incorporating intense effort from my back and upper body muscles, my ascension began. Synchronized pull-ups and pelvic thrusts enabled me to reach a height of 20 feet where I momentarily paused to nail an identification number to the tree (#88). After securing the laminated number with a nail, I carefully removed some of the tree's outer bark layers using a large-bladed knife. After filling a small white paper bag half full with bark, I folded the top edge over and let it cruise to the ground for Ted Stampfer to label with the appropriate data (tree number, height of collection, and climbing site). Collection height was measured using an altitude line that was attached to the harness and hung down to the ground. These handy

lines were handmade by our ground crew by attaching labeled paper tags to a lightweight line.

Climbing higher and higher to the rhythm of my own song, I paused once again at about 9.1 m to take another bark sample. During my usual scanning of the bark before removal I noticed an unusual snake-like pattern on the bark surface. Suddenly vivid flashbacks of Dr. Keller's slide show on the myxomycete life cycle appeared in my mind. The previous night Dr. Keller presented a lecture to all of the climbers and ground crew in order to orient our eyes for recognizing Myxomycetes. As an insecure undergraduate student and non-myxo expert, I thoroughly doubted what I was seeing (on the tree, not in my mind). The tracks on the bark looked identical to the remains of plasmodial tracks left by developing myxomycetes. In a bewildered state my voice cracked as I hollered down to Ted Stampfer about these weird configurations. Ted and I continued on, as Dr. Keller remained faithfully at his station helping another climber under a different tree up the trail. Meticulously, I scanned the circumference of the tree with my naked eye. I then found tiny myxo-like sporangia scattered among the side-winding plasmodial tracks. Taking another large sample and sending it down to Ted, I nonchalantly requested that Dr. Keller come have a look at my discoveries upon completing his task.

Inching my way higher up, I paused at 3.3 m increments to collect more bark samples. Oddly, the twisted pattern on the bark seemed to follow my ascent up to almost 26.4 m. Dr. Keller was finally freed of his duties and took the opportunity to glance at my samples using a hand lens. Swaying high above the muddy forest floor I heard a lot of hooting and hollering like it was a Fourth of July celebration and I saw Dr. Keller do the jitterbug dance (ironically, the day was the Fourth of July, 2000). The celebration below me confirmed the discovery of a very unusual myxomycete. I enjoyed the free roller coaster ride of swaying to and fro in the tree top in the peaceful wind and in the panoramic view of heaven. I was eager to come down because the harness began cramping my legs. The day's heat index continued to skyrocket as I hung in discomfort. Dr. Keller enthusiastically asked that I come down in smaller steps and sample more bark about every three meters.

Finally, after about two hours up in the treetop I reached solid ground. Releasing the tight grips of the harness and shaking out my numb legs, I took a deep breath and smiled at the crew helping me. The quickly passing morning gave way to hunger pains so knowing there was still a lot more climbing ahead that day, we all sat down to devour our lukewarm sack lunches as the new discovery hibernated in its collection bag. Glories die fast when you have a hungry stomach.

After lunch our crew continued the hike up Turkey Pen Ridge Trail, which was now at a more rigorous incline. Then, all of a sudden, we came to a steep drop-off that opened up to a large cave entrance with a magnificent waterfall cascading down into its depths. Sliding and slowly scooting we cautiously went down the ledge. The temperature fell about ten degrees and soothed our overheated pulses. Laura Henley and I climbed two nearby walnut trees while the others reaped the comfort of the surrounding elements. After the passing of another two hours the gang packed up and made a beeline back to the car.

We drove home and upon immediate arrival at our humble abode we threw some hardy supper on the grill. Anxiously, I dragged out the samples of *Q. alba* tree number 88 and began to separate out the day's unusual discovery.

Dr. Keller was extremely impressed as he scurried around boxing up some of the more impressive samples. Finally, the food was ready and we had to be pried away from the beautiful display of Myxomycetes. With bark flakes deeply engrained into our hard-working hands, we happily rejuvenated ourselves with grilled chicken, potatoes, and mixed vegetables. Without any real jaw-dropping firework display, we truly had ourselves a very explosive Fourth of July. The day's spectacular discoveries and accomplishments helped us sleep well and look forward to the final two days of our three-week trip.

By the end of our first three-week research session in the Great Smoky Mountains National Park, we had sampled from 80 to 90 trees of various kinds: white oak, ash, tulip poplar, American elm, eastern red cedar, sweet gum, white pine, walnut, and more. During our second, three-week excursion we sampled from approximately the same amount of trees. At the end of each climbing session, ample time was taken each evening to divide up each tree's sample bags into different categories of organisms. The categories included liverworts and mosses that were taken by Dr. Paul Davison, liverwort expert, and Dr. David Smith, moss expert; the lichen category which went to Dr. Alex Ciegler, lichenologist; and the moist chamber category which the students took back to CMSU for our own research purposes. A portion of the white oak tree number 88 sample was given to Professor Uno Eliasson from Sweden and Dr. Ted Stampfer, moist chamber culture specialist, for further investigation of the new myxomycete discovery. Even after appropriate separation, the sample bags were so numerous that they barely squeezed into the back of a Toyota pickup truck. Completing our collection task for the summer of 2000, our climbing crew returned to Warrensburg, Missouri, to begin moist chamber cultures and simultaneously start the fall school session.

This was my first undergraduate field research experience. I did not exactly know where to start with the overwhelming number of bark specimens. I was especially intimidated by all of the new information of how to set up moist chamber cultures (consisting of a Petri dish, sterile filter paper, properly arranged bark pieces, and the necessary amount of autoclaved water), harvest the developed sporangia, label and categorize the species, take digital pictures of the myxomycete developmental stages, and make slides in order to take precise measurements and notes on the morphology of spores, capillitial threads, stalk, columella, and more. Because Dr. Keller had warned us from the very beginning that this second phase of our research project would not be as exciting as the climbing endeavor, I prepared myself for a monotonous boring semester of research.

I grew to enjoy the laboratory aspect of seeing the diverse beauty of life and harvesting the developmental stages of myxomycete sporangia. For several weeks the experts, Drs. Uno Eliasson and Ted Stampfer, had been trying to get the new myxomycete species of *Diachea* to grow in culture, but neither of them had been successful. Surprisingly one of my moist chambers containing bark from tree 88 developed the growth of a magnificent yellow plasmodium. My boredom changed to excitement when observing the development of myxomycete plasmodia and sporangia in moist chamber cultures each morning. The day was an ordinary school day starting at eight in the morning. I casually walked to our research laboratory while smiling at passing friends. I sat down for the millionth time to scan the moist chamber cultures with a dissecting microscope; when low and behold an iridescent gold peridium attached to a

reddish-orange stalk came into view. I did not debate very long whether or not to call Dr. Keller's private "emergency only" hotline. Unconvinced of my findings Dr. Keller continued on with his own daily professional work. My bubble of excitement burst so I dragged myself to my nine o'clock class. After class I retreated back to the research room to see if Dr. Keller had visited the premises. Upon my arrival I saw Dr. Keller doing the jitterbug once again and saying phrases like "Oh, my word! I didn't believe you. How did you know it was the new species?"

Our whole research project from the very beginning has been much like a fairy tale. Our undergraduate crew was interviewed by several newspapers and we have written numerous magazine articles. The publicity is nice but that is not what really matters. The priceless discovery of the deep beauty of nature is what really makes things count. I never knew such glory existed in microscopic proportions. It is truly a shame that so little of the world's population will ever see these splendid organisms. This project has taught me to concentrate harder on nature and not just take the big picture for granted. Trees are made of more than just branches and leaves. They consist of a mosaic of mosses, lichens, liverworts, bugs, and yes even Myxomycetes.

Myxomycetes are breath taking! One does not have to discover a new species to be awestruck by them. I believe that more people/students should be taught about nature's small wonders. In fact I believe the subject is so intriguing and important that I have excitedly begun to teach my parents about Myxomycetes: Melissa ends.

### **Observations and interactions between myxomycetes, mollusks, and nematodes**

Student curiosity combined with being at the right place and right time led to serendipitous discoveries. Kenny Snell went collecting for myxomycetes with a flash light and fortuitously found an extensive area of stalked sporangia represented by immature soft, milky white, stages and mature, reddish brown stages with spores of the myxomycete *Stemonitis axifera* (Bull.) T. Macbr. The recent heavy rains several days before arriving at lodging quarters behind the Cades Cove Ranger Station in the GSMNP had created ideal moisture conditions for myxomycete development on the decayed tree trunks on ground sites. A *Quercus alba* L. log with exposed wood and bark sloughing off the sides was the source of the slugs *Philomycus carolinianus* (Bosc, 1802) and *P. flexuolaris* Rafinesque, 1820 that were crawling to the exposed surface areas of the wood from underneath the flaps of bark. Three successive nights on June 11, 12, and 13, 2001 these slugs selectively fed only on the developing immature sporangia, eating each sporangium from the top downward. Entire groups of the immature sporangia were eaten within two to three minutes. Details of the slug feeding activity were published and a color image showing the slug *P. carolinianus* eating the immature sporangium of *S. axifera* was selected for the front cover artwork of the journal *Mycologia* (Keller & Snell 2002).

Another student, Courtney Kilgore, had prepared moist chamber cultures of dead flower stalks and attached capsules of *Yucca smalliana* Fern. collected at Pertle Springs and also dead flower stalks and attached follicles of *Asclepias syriaca* L. collected from Taberville Prairie in Missouri. The white phaneroplasmodium of *Physarum cinereum* (Batsch) Pers. had developed on the substrata and migrated to the undersurface of the plastic Petri dish lid. The same

plasmodium was also present on the stems and capsules/follicles along with plasmodial tracks on the filter paper in the bottom of the Petri dish. While photographing the phaneroplasmodium, she observed nematodes on the underside of the Petri dish lid actively moving into and among the plasmodia. Hundreds of worms had migrated onto the lid around the plasmodium and were observed penetrating the plasmodial veins headfirst with their entire body inside the plasmodial veins and in some cases half inside and half outside. Interestingly, rotifers were also observed associated with the phaneroplasmodium (Kilgore and Keller 2008).

Simple experiments were designed to determine if the nematodes were actually feeding and ingesting the contents of the plasmodium and also the black spores of the mature sessile sporangia of *Physarum cinereum*. Four Petri dishes of 2 % water agar were prepared and inoculated with the yellow sclerotia of *Physarum polycephalum* Schwein. Sterile old fashioned oat flakes were scattered on the agar surface and about 5 ml of sterile distilled water was added to create a thin film of water. Approximately 48 hours later the typical bright yellow phaneroplasmodium and trailing network of veins had developed and covered the oat flakes and agar surface. The original *Yucca* and *Asclepias* plates were mist sprayed and 5 ml of excess water was added to the plasmodial cultures. The nematodes and rotifers apparently had encysted and the additional water had revived their motile stages because the agar plates were teeming with crawling nematodes and swimming rotifers.

Dr. Howard Ferris (pers. comm.) identified the nematodes as bacterial feeders in the genus *Panagrolaimus* and most similar to *P. rigidus* (Schneider, 1986) Thorne, 1937. The nematodes and rotifers were transparent and colorless so their internal contents could be observed. The head, feeding mouth parts, and internal parts of the nematodes and rotifers were observed with a compound microscope at 100 and 430 X magnification. Approximately four hours of careful observation over a four day period failed to confirm the presence of either nematodes or rotifers inside the plasmodial veins. Furthermore, the nematodes aggregated around the slime sheath along the plasmodial network of veins and appeared to feed on the surface areas presumably on concentrations of bacteria. Plasmodia developed into the typical multi-lobed spore cases with brown spores of *P. polycephalum*. No evidence was observed of nematodes and rotifers feeding on the dark brown myxomycete spores.

### **Other tree canopy cryptogams: fungi, lichens, mosses, liverworts, and ferns**

Student climbers were given instructions to search for macrofungi along the bark surface from 3 to 30 m. Only three species of macrofungi were found at 4 to 6 m and only 2 corticioid species. Surprisingly, macrofungi were rarely observed in the tree canopy on the bark surface of healthy living trees (Keller 2004).

Tree canopy bark samples were examined for lichens and 195 taxa and of these, 84 apparently represent new lichen records for the GSMNP. *Phaeophyscia hispidula* (Ach.) Essl., a brown foliose lichen found in the canopy of *Juglans nigra* L. and *Liquidambar styraciflua* L., is primarily a northern species so that its occurrence in the canopy may represent a disjunct (Ciegler et al. 2003). *Gomphillus americanus* Esslinger is a rarely collected species confined to southeastern U.S.A. This abundant crustose lichen occurred at 15 m on *Fraxinus americana* and at 20 m on *L. styraciflua* intermixed with mosses. This lichen has stalked, peltate, hyphophores 1-2 mm tall that have a conspicuous starburst

appearance with a marginal fringe of sharp points. This collection represents a new record for the state of Tennessee and GSMNP. All lichen species recorded from the tree canopy in GSMNP also occur on ground sites (Keller 2004). Student climbers repeatedly observed that lichen growth and biomass increased near the top of the tree. This appears to be related more to sunlight as the canopy becomes more open at the top. Lichen observations at d.b.h. in densely shaded areas confirmed that lower levels of the trunk had less lichen cover than at higher levels of the tree trunk. The foliose lichen growth form had the highest species richness based on bark samples gathered from the trunks of 4 different living tree species and 8 individual trees at 3 m increments to 36 m. The crustose lichen growth form had the second highest species richness and the fruticose growth form was only observed on one tree trunk but was more abundant on horizontal branches away from the trunk (Fanning et al. 2007). The first Lichen Bio-Quest was held in GSMNP June 19-20, 2004 that resulted in 88 species, including seven new lichen records, and three new lichenicolous fungi. This paper has a noteworthy discussion about how to organize and lead field forays for the participants (Keller et al. 2007).

Epiphytic liverworts represented by 21 species were identified from bark samples gathered from 110 trunks of living trees at heights from 3.5 m to 30 m (Davison and Keller 2004). There were 37 moss species collected from the tree canopy. The light-loving moss, *Drummondia prorepens* (Hedw.) E. Britton, was collected frequently high in the tree canopy, yet it is only known from four ground sites in the GSMNP. All of the bryophyte species found in the tree canopy were also known from ground sites (Keller 2004).

The typically lithophilic fern, *Polypodium appalachianum* Haufler & Windham, was found growing as a canopy epiphyte 35 and 40 m above ground level on horizontal branches of a champion-size *Liriodendron tulipifera* in the GSMNP. Damon Lesmiester was the student climber who discovered this epiphytic fern growing as mature plants with immature and mature sori. Occurring along with this fern was an assemblage of terrestrial mosses including *Rhodobryum roseum*, an assortment of collembola (springtails), and a flightless proturan insect species (*Acerentulus confinis* (Berlese, 1908) only known from soil and litter. The distinctive features of this canopy habitat may effectively duplicate ecological conditions normally found only at ground level, establishing the opportunity for translocating an entire community and providing biologists with new insights on the origin of some epiphytes (Keller et al. 2003).

### Research Experience for Teachers

The NSF-Research Experience for Teachers Program facilitates professional development of K–12 teachers on the cutting edge of science through partnerships between local school districts and universities (Keller 2005). Trish Smith, a Warrensburg Middle School seventh grade life science teacher, along with students and faculty from UCM, participated in a summer tree canopy biodiversity project in the GSMNP (Smith 2005, Smith and Keller 2004).

A website was created at <http://warrensburg.k12.mo.us/iadventure/GSMNPiadventure/> where the field or Adventure Phase “Exploring Life in the Forest Canopy,” represented the first tier of the iAdventure website. This website enabled students and teachers to experience tree canopy research and learn about the All Taxa Biodiversity Inventory supported by Discover Life in America ([www.dlia.org](http://www.dlia.org)). This was followed by the Laboratory Phase where students

observed moist chamber cultures with wet bark that enabled students to observe a living miniature ecosystem composed of myxomycetes, fungi, lichens, mosses, liverworts, green algae, cyanobacterial algae, myxobacteria, tardigrades, insects, nematodes, and possibly other invertebrates. The students found several rare myxomycete species such as *Echinostelium arboreum* H.W. Keller & T.E. Brooks, known only from a few locations in the world.

The second tier of the website at <http://warrensburg.k12.mo.us/iadventure/whatis.html> was an iAdventure problem-solving activity. Students determined the direction and outcome of a content-rich storyline, using resources available on the Internet. This activity was designed to help students discover how to use and access data and information on the Internet and to solve problems and make choices. Students were expected to develop their own research questions and design their own experiment using the specimens and collected data. This subsequently led them to the Publication Phase, where they were expected to create poster presentations shared with parents and the school community. These classroom activities and website experiences encouraged secondary students to choose field biology as their future career (Smith & Keller 2004).

### Questions, questions, and more questions

This tree canopy biodiversity research project has generated many more questions based on the data gathered. Clearly the bark pH differs between different species of living trees and only certain myxomycete species assemblages are associated with lower more acid pH, another group occurs in a middle pH range, and still another group occurs only near a neutral pH or slightly alkaline, and some fewer myxomycete species are generalists that occur from the lowest to the highest pH range. What physical and chemical properties of bark influence pH values? How important is the water absorption capacity of the bark? How does the age and size of the tree species influence species diversity, species richness, and myxomycete succession over time? Where should we look for new myxomycete species? What microorganisms are present on the bark of living trees that interact with the life cycle stages of myxomycetes? Why have so few corticolous myxomycetes been cultured from spore to spore especially species in the genus *Macbrideola* and *Cribraria*? What myxomycete species do we see most often together? What role does the percentage and distribution of epiphytic cover on the bark surface such as lichens, mosses, liverworts, green algae, cyanobacteria, have when associated with myxomycete species assemblages. Why are so few species of macrofungi found on the bark surface of living trees? How long does it take for myxomycetes to colonize the bark surface of living trees? There are still many areas of the Old World and New World Tropics that are unexplored but also the giant redwoods such as *Sequoia sempervirens* (Lamb. ex D. Don) Endl. in California that may live for more than 2,000 years and include the tallest trees on Earth. What myxomycete species are found on the bark surface of these "big trees" and other giant gymnosperms located in northwestern United States of America? The next generation of tree canopy biologists should consider answering these questions especially for myxomycetes and fungi. More research and exciting discoveries still await explorers in the tree canopy!

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The success of this tree canopy project depended on numerous individuals, including local residents in the GSMNP area who knew where to find a champion-sized tree or grapevines and professionals who offered their expertise in taxonomic identification and reviewing papers for publication. Keith Langdon and Paul Super from GSMNP gave assistance in obtaining collecting permits, maps, and directions to find big trees. Jeanie Hilten assisted with equipment needs, logistics, park directions, and lodging at GSMNP as part of Discover Life in America. Carolyn and Reid Franks generously offered their home and friendship to us on numerous occasions while we conducted research in GSMNP. David Taylor, botanist for the United States Forest Service at the DBNF in Kentucky, assisted in obtaining collecting permits, lodging facilities, and finding suitable tree climbing sites.

Many individuals accompanied the tree canopy team on expeditions to GSMNP and offered their expertise in a particular field, and participated as ground crew members. These individuals included: Alex Ciegler, Paul Davison, Uno Eliasson, Thomas Gaither, Diane Nelson, Kenneth Nelson, Jay Raveill, Trish and Stan Smith, and Ted Stampfer. Stephen Wilson assisted with canopy flight-intercept insect traps in GSMNP and Big Oak Tree State Park, served on graduate student thesis committees, edited theses, and reviewed papers for publication. Trish Smith involved seventh grade life science students at Warrensburg Middle School with the Research Experience for Teachers project by culturing myxomycetes in the classroom, developed an interactive website for students to participate in their own tree canopy adventure, and invited members of the UCM tree canopy team to visit the classroom to help identify organisms in moist chamber cultures. Uno Eliasson aided in collecting and identifying myxomycete specimens that were new records or had unusual characteristics, and he reviewed papers for publication. Karl and Jeanne Braun and Ted Stampfer reviewed papers for publication.


University of Central Missouri professional staff (Lisa Schmidt, Terry McNeeley) contributed many hours assisting with posters, power point presentations, web site construction, and Glenda Carmack volunteered her photographic skills to record our climbing activities at Pertle Springs, Missouri. Pamela Ganley, Coordinator for Evergreen Cemetery, provided photographs of *J. virginiana* (Figure 1) and information and details about the history of the cemetery. I (HWK) especially want to recognize the Association of Southeastern Biologists members and supporters for their friendship and camaraderie since the first meeting I attended held at Mobile, Alabama in 1972. Tim Atkinson from the Carolina Biological Supply Company has given invaluable advice over the years.

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## SYMPOSIUM II SUMMARY

### *Research at Undergraduate Institutions: Pitfalls and Possibilities*

**April 17, 2008 – Spartanburg, South Carolina**

Organizers: Bill Ensign (Kennesaw State) and  
Dennis Haney (Furman University)

In 2006, the National Science Foundation published the findings of a multi-year study addressing the role of undergraduate research in science and math education. Not surprisingly, the results indicate that the undergraduate research experience has a positive effect on student pursuit of post-baccalaureate educational opportunities in the sciences. Although there were multiple factors influencing this result, one of the most important was the role of mentoring. When mentors were polled about their attitudes regarding the undergraduate research process, 7 in 10 said they receive "personal satisfaction" from their role as an undergraduate research mentor, while only 4 in 10 said undergraduate research was positively weighted in the promotion and tenure process at their institution. Given the importance of the undergraduate research experience in encouraging students to remain within the sciences, institutions whose mission focuses on undergraduate education are essential to maintaining our nation's role as a leader in science. This symposium focused on both institutional and pedagogical factors that influence effective research programs at undergraduate institutions. **Chas Gowan** from **Randolph-Macon College**, **Michael Dorcas** (with co-author **Steve Price**) from **Davidson College**, **Dennis Haney** (with co-authors **Greg Lewis** and **Brannon Andersen**) from **Furman University** and **Thom McElroy** (with co-author **Paula Jackson**) from **Kennesaw State** discussed pedagogical approaches that further the needs of both the faculty and undergraduates involved in the research process. **Bill Ensign** (with co-authors **Ron Matson** and **Scott Reese**) from **Kennesaw State**, **Melissa Pilgrim** from **University of South Carolina-Upstate**, **Terry Farrell** from **Stetson University** and **Darwin Jorgenson** from **Roanoke College** addressed institutional factors associated with undergraduate research that facilitate (and in some instances, impede) faculty professional development at undergraduate institutions.

The talk by **Chas Gowan** explicitly recognized one of the basic problems faculty face when they undertake a research program that involves undergraduates. Mentoring undergraduate research is personally rewarding but time consuming. Institutions vary in how time spent mentoring student research is counted towards tenure and teaching loads, but a recent National Science Foundation survey indicates that most institutions do not place significant weight on such mentoring. As such, faculty need strategies to maximize the efficiency of research mentoring and the recognition of this effort by the institution. At Randolph-Macon, Gowan and his colleagues are incorporating research mentoring into traditional courses. Advantages are that mentoring becomes part of the normal teaching load, and groups of students are mentored simultaneously. Problem-based learning (PBL), a pedagogy in which

development of skills and content knowledge is driven by the need to analyze a problem, is perfectly suited to the task. The Environmental Studies Program at Randolph-Macon has instituted a series of PBL courses designed to develop student research skills. Each course requires students to investigate a real-world environmental problem, with real stakeholders and off-campus collaborators. Courses were designed based on pedagogical research indicating that PBL engages students by having them investigate a challenging problem that does not have a known answer. As in traditional research activities, students have to define the problem, research the literature, propose hypotheses, design experiments, gather data, draw conclusions, and write, present, and defend their results. Our experience to date indicates that students who have completed one of these courses are ready to undertake individual research with much less supervision and much more success than those who have not. Since at least some of the PBL-based courses are early in the curriculum at Randolph-Macon, an added advantage is that faculty are also able to identify research-capable students early in their academic careers.

**Michael Dorcas** provided an overview of his approach to herpetological research at Davidson College and how it has served as the core of a teaching/research program designed to get undergraduate students engaged in quality research. Herpetology has been an ideal field for such a program because of, 1) the current interest in the biology and conservation of amphibians and reptiles, 2) the diversity of amphibians and reptiles offers an immense variety of natural history characteristics that can be studied, and 3) most species of amphibians and reptiles are easy to work with in the laboratory and field. Strategies that have enhanced Michael's program include using technology to facilitate research, focusing on ecosystems in which students may have had previous class work, establishing long-term projects, collaborating with outside organizations, and involving the local community in our research program. Students involved in the program have regularly published in peer-reviewed journals, presented at scientific meetings, and received external funding for their research. From the faculty side, conducting research with undergraduate students can present challenges; however they can generally be overcome by close mentoring and developing strong working relationships with everyone involved. Overall, undergraduate students can serve as highly productive researchers to investigate interesting herpetological questions and phenomena.

**Dennis Haney's** talk focused on the advantages an interdisciplinary research team of faculty brings to an undergraduate research program at a primarily undergraduate institution (PUI). The majority of PUI faculty are in an institutional environment where undergraduate education is the primary goal, and as a result, teaching loads are typically much higher than at institutions with a graduate mission. Since undergraduate education has primacy, it is generally expected that faculty research efforts will involve undergraduates. Undergraduate students typically have less time available for research and require much closer supervision than graduate students. Furthermore, faculty often have fewer resources available to them. One solution to these problems at Furman has been the formation of an interdisciplinary research program, the River Basins Research Initiative (RBRI), involving faculty and students from the Biology, Chemistry, and Earth and Environmental Sciences Departments. Given the

collaborative nature of the team, it is easier to design projects undergraduates can accomplish while still educating and doing good research. Since there are multiple faculty involved, there is more help in supervising students. The interdisciplinary focus of the RBRI has expanded funding opportunities and provided an increased resource base, with equipment and expertise from multiple people in multiple departments. Finally, interdisciplinary research is an unfilled 'niche'. Research across disciplines is rare in big research universities, so PUI faculty can take advantage of their close proximity, and the fact that we know people across campus very well to do meaningful research by asking questions that span disciplines. Collaborators in the RBRI have been able to fund a successful research program that has resulted in 12 peer-reviewed publications and over 120 presentations since 2001, mostly with undergraduate co-authors. The RBRI has involved more than 170 student participants since 1997, and the program has been funded by grants from NSF, EPA, NASA, South Carolina Department of Health and Environmental Control, the Associated Colleges of the South, the Rockefeller Brothers Foundation, the Saluda-Reedy Watershed Consortium, the Mellon Foundation, and Furman University.

While many undergraduate institutions have relatively small class sizes that promote the development of mentoring relationships, there are undergraduate institutions that serve larger populations. **Thom McElroy** provided information on the approach to undergraduate research at Kennesaw State University where the number of undergraduate majors in the Department of Biology and Physics is over 1200. Although large class sizes at KSU reduce the opportunity for in-class directed research projects, the faculty recognize the importance of research experience opportunities for students. In many cases, students need these experiences to be competitive for admission to professional and graduate programs. The system used at KSU is a two semester process that guides selected students through proposal development (1 credit), data collection and analysis, and presentation of results to the community (3 credits). For faculty there is no direct credit towards course load; however, for every three students who complete directed study, the supervising faculty member receives a course load reduction of three hours. Data were collected directly from 12 research active faculty who reported on the number of students mentored, student presentations outside the department, publications from student research, and extramural grants to support undergraduate student research. Over a five year period (2002-2007) 96 students were involved in the directed study experience. Faculty averaged almost 2 students per year, and 68% of those students presented their research outside the department at professional conferences. In that same period of time faculty produced 8 publications that were the direct result of student research. One extramural grant related to undergraduate research has been received. On average, faculty members have invested time and effort in ten directed study students to produce a peer-reviewed article. Although only a small percentage of the undergraduate student work has resulted in peer-reviewed publications, faculty have been successful at meeting the requirements for tenure and promotion at KSU, in some cases by establishing outside research collaborations that resulted in peer-reviewed work. In an institution where peer-reviewed publications are a primary means of faculty assessment, a faculty member that relies exclusively on directed studies risks a negative tenure decision, but directed study is of great value to students. In the

proper context, a directed study approach can help faculty maintain a productive research program at a large undergraduate institution.

**Melissa Pilgrim** addressed the issue of faculty professional development and undergraduate research from the perspective of a tenure-track faculty member at a branch campus of a larger state research institution, the University of South Carolina Upstate. Having a significant tie with a large university opens the door for a world of interesting possibilities and inherent challenges. There are advantages (e.g., access to internal funding opportunities and research facilities) and disadvantages (e.g., tenure decision depends on support from both your home institution and the main research campus) in accepting a tenure-track faculty position at a branch campus. The annual evaluation template at USC Upstate summarizes faculty productivity by assessing teaching, research, and service as separate categories. She suggested that an integrative approach to how we view our job responsibilities can be an effective time management strategy. An integrative approach not only entails choosing activities that blend our job responsibilities, but entails building a collaborative framework for interacting with colleagues and students at other academic and government institutions. While most acknowledge the value of research opportunities in the professional development of our students, time constraints and lack of resources at undergraduate institutions often discourage faculty from mentoring undergraduates. At USC-Upstate, Melissa has designed an undergraduate research program that maintains active collaborations with groups such as the University of Georgia's Institute of Ecology, the Savannah River Ecology Laboratory, the Davidson College Herpetology Lab, the South Carolina Department of Natural Resources and the United States Geological Survey. Since research activities are fully integrated into teaching and service responsibilities, faculty are not penalized for time spent mentoring undergraduates, and ultimately the true beneficiaries are the students.

**Terry Farrell** brought his experience as a former department head at Stetson University to the discussion and addressed how the tenure and promotion process often fails to value the role mentoring plays in undergraduate development. He presented information on tenure and promotion processes from a variety of colleges and universities to illustrate how several impediments often arise that devalue the mentoring of undergraduate research. These impediments include: 1) a lack of any standardized data that quantifies faculty success as a mentor of undergraduate research, 2) a lack of "release time" for faculty strongly involved in mentoring student research, 3) a lack of colleagues that strongly value undergraduate research on key promotion committees, and 4) the widespread view that mentoring undergraduates constitutes neither an important teaching role or a major research effort for faculty. He then presented ideas regarding how institutions could alter their policies in a way that would promote the mentoring of undergraduate research and avoid these pitfalls. He also presented a more pessimistic, but hopefully useful, set of guidelines for faculty who are currently negotiating the tenure and promotion process. Terry's conclusion was that it will be extremely difficult to develop strong undergraduate research programs without meaningful institutional incentives that influence tenure and promotion decisions.

As the current Biology Department chair at Roanoke College, **Darwin Jorgensen** described his approach to mentoring incoming faculty as actively encouraging initial teaching efforts while supporting and facilitating their early engagement in undergraduate research. As a departmental administrator, balancing the teaching and research expectations in development of new faculty workload is essential. Since teaching is often the cornerstone at a PUI, expectations for classroom performance are higher than at institutions with graduate programs. Department heads should be cognizant of the fact that for most new faculty, *all* courses are new preparations with the attendant time expectations. Moreover, a course with a laboratory component really is the equivalent to two new preparations. Therefore, teaching assignments should be made strategically so that time is provided for the start-up of research efforts, which must happen during the first year. Early support of research efforts by the Department chair is essential and that support must be both fiscal and time-sensitive. Incoming faculty should be encouraged to write grants, since their "marketability" as researchers will never be higher. Finally, completion of manuscripts from doctoral or post-doctoral work should receive high priority so junior faculty can maintain the publication record necessary to remain competitive for external funds. Involvement in service activities, certainly outside the Department, should be brought forward in a well-planned and confined way.

**Bill Ensign** presented the results of a survey administered to biology department heads at 64 PUIs throughout the Southeast. One aspect of undergraduate research addressed by the survey was the relationship between the level of institutional support for undergraduate research and the weighting of undergraduate research in the tenure and promotion process. Key factors addressed in the survey assessing the level of institutional support were the availability of research start-up funds, availability of dedicated in-house funding programs to maintain research and the availability of release time to engage in undergraduate research. A second set of questions assessed the importance of undergraduate research in the tenure process. While over 75% of the responding institutions listed undergraduate research as either important or a requirement for tenure, only 10% of respondents provided all three of the institutional support factors to promote undergraduate research. A second aspect addressed by the survey was the effect of institutional support and expectations on products produced, specifically the number of undergraduates engaged in research per faculty member and the number of publications produced per faculty member. While the number of undergraduate research students per faculty was invariant across either support levels or tenure expectations, the number of publications per faculty member increased with increased institutional support. If the goal is to involve more undergraduates in meaningful research experiences, the survey results seem to indicate that there is a mismatch between the expectations of the institutions, the support provided and the outcomes being achieved.

The spirited conversation that ensued in the open forum following the presentations by the eight speakers indicated that many of the topics discussed were near and dear to the hearts of the attendees. Among other issues, symposium participants commented on how the path to tenure and promotion varied among different institutions in terms of the composition of key committees and how these committees are formed. Regardless of institutional affiliation,

there was a consensus that almost all colleges and universities fail to value the faculty time and energy that are required for successfully mentoring undergraduate research. A second line of discussion that developed was whether the perceived value of providing strong undergraduate research experiences was uniform among different disciplines in Biology. Concern was expressed about whether more reductionist faculty valued undergraduate research in a similar fashion to ecologists. At the same time, there was some question as to whether achieving tangible results in organismal or ecological disciplines was in some way easier than similar tangible results in research at the cell and molecular level. While this discussion reached no consensus it was clear that biology departments must unite to develop a focused emphasis on the role of undergraduate research in evaluating faculty performance.

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Statue of Vulcan. It is the largest cast iron statue in the world and a symbol of Birmingham. The 56-foot tall statue of the Roman God Vulcan, God of Fire and Forge, was created as Birmingham's entry in the 1904 World's Fair in St. Louis. It commemorates Birmingham's iron ore riches and its steel manufacturing roots. It is the 7<sup>th</sup> tallest freestanding statue in the US.

## **Symposium III Summary**

**2008 Annual Meeting of the Association of Southeastern Biologists  
Spartanburg, South Carolina  
18 April 2008**

### ***The Southeast Regional Knowledge Partnership: from regional relevance to global significance***

**ORGANIZER:** Frank S. Gilliam, Department of Biological Sciences,  
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Ecological relationships are frequently ignored in project planning and implementation because planners and other stakeholders lack the time and resources to rapidly assimilate, interpret, and apply currently available ecological data and knowledge. One of the current challenges to the Ecological Society of America (ESA) is to develop effective "knowledge partnerships" with decision makers in government and business. Through these partnerships we can share the basic principles of ecology and clarify how they can help shape solutions to some of society's most vexing problems and promote sustainability. The vast majority of decisions that affect the environment are made in the private sector and on the local governmental level. Whether the decision maker is a factory supervisor or a county elected official, it is critical that they know how to seek, obtain, and use the best available ecological knowledge. Effectively addressing complex environmental problems requires access to accurate and up-to-date ecological information.

The ESA recognizes its Southeastern Chapter (SE-ESA) as the oldest regional chapter and the one with the largest membership. Accordingly, it has targeted SE-ESA, and its affiliation with the Association of Southeastern Biologists (ASB), as a logical, effective place to start in establishing dialogue toward implementing the Southeast Regional Knowledge Partnership, which will seek to bring scientists, policy makers, and business and community leaders together to address the particular environmental issues confronting the states of Alabama, Louisiana, Mississippi, Florida, Georgia, North and South Carolina, Tennessee, Virginia, and West Virginia.

Ecologists who want to affect-decision making about the environment must understand the needs of decision makers and how to make ecological knowledge available in a form that is both accessible and useful. One way of accomplishing this is to enhance collaboration among community leaders, government officials, business leaders and environmental scientists. These four sectors are the target audience for the Southeast Regional Knowledge Partnership, the primary purpose of which is to create a series of forums and networks in which ecological information is made available and usable by individuals in local communities, government, business, and industry.

The purpose of this SE-ESA Chapter-sponsored symposium was to initiate dialogue among Chapter members and other interested attendees at the 2008 meeting of the ASB. This was accomplished by first providing overviews of environmental issues of particular relevance to the southeast region. Following

these presentations was an open dialogue between and among presenters and attendees.

### ***Connecting Stakeholders Views on Ecosystem Services in the Southeast***

**Alan P. Covich**, Odum School of Ecology, University of Georgia, Athens, GA

The Ecological Society of America (ESA) has worked for nearly 100 years to communicate ecological concepts to stakeholders at the national scale, especially regarding sustainability. Enhancing communication with the general public and especially with decision makers remains one of ESA's highest priorities and is a major part of the current strategic plan. ESA's goal now is to make these connections more effective at regional scales. Because many environmental problems are local and regional, it is important to develop many more dialogues among ecologists and decision makers across different scales. These discussions can promote informed solutions to different environmental problems. A major goal of the Ecological Society of America's Southeastern Knowledge Partnership is to share the basic principles of ecology with decision makers and to clarify how these principles can help solve some of society's most complex challenges. One way to increase understanding of the total values of natural ecological processes is introduce the concept of ecosystem services. This approach emphasizes that protection and sustaining of biodiversity is essential for continued production of "goods" such as fisheries and drinking water as well as processes protection of river banks by riparian forests.

Ecosystem services are beginning to help ecologists communicate with a wide range of stakeholders regarding the total economic, ecological and social values of these natural dynamics. However, translating ecosystem processes such as breakdown of organic matter and nutrient cycling into "goods and services" remains in the initial stages of development. These concepts require review of both market and non-market values. Defining and measuring ecological values have deep roots in early studies by ecologists in the southeast. For example, the importance of wetlands in processing nutrients was proposed by Eugene P. Odum, Howard T. Odum, Charles Wharton and others in the 1960s and expanded throughout the region in the 1970s.

It is timely to ask stakeholders interested in working to improve environmental quality for their ideas on how to advance better understanding of these types of natural processes and ecosystems services. The recent drought and the likelihood of increasing high frequencies of extreme variability is one example of how ESA and other ecologists can rapidly respond to assist individuals and governmental agencies. There is an immediate need to deal effectively with challenges associated with ecosystem services such as sustaining clean drinking water. Adapting to climate variability and its ecological consequences will be important in the southeast where prolonged and frequent droughts have not usually been issues of persistent regional concern.

It is important to remind policy makers that the future may be very different from the recent past and that climatic changes can greatly alter ecosystem processes. The concept of 500-year floods or droughts is misleading when sufficiently long data records are lacking to determine actual recurrence intervals of past events. Even if such data were available, the future may be more like the recent observations of frequent extreme highs and lows in precipitation. The

effects of more intense hurricanes and associated floods may combine with effects of more prolonged and frequent droughts to alter how ecosystems function. To assist in this process, ESA proposes to create Regional Rapid Response Teams and to begin in the southeast where members have expressed interest in participating in developing this partnership.

***ESA's Rapid Response Teams: Placing science at the heart of environmental decision making***

**Nadine Lymn**, Ecological Society of America, Washington, DC

In 2005, the Ecological Society of America established its Rapid Response Teams (RRTs), inviting approximately 40 of its members to serve as 'rapid responders' to inform policy and media issues with ecological science. ESA's RRTs enable the Society to weigh in on policy and media opportunities, providing relevant ecological information to the congressional, executive, and judicial branches of federal government. Issues have included biofuels, climate change, Hurricane Katrina, and pollinator ecosystem services. ESA hopes to work with its regional chapters to launch regional RRTs modeled after the Society's national level initiative.

The Society's goal in establishing the RRTs was to ensure the appropriate use of ecological science in decision-making. ESA has positioned itself to be an 'honest broker of information' offering tools for decision-making, references to the best available science, and translating technical knowledge into understandable terms. Collectively, ESA's RRTs offer expertise on a wide range of issues, from disease ecology to biofuels to climate change. The Society's Public Affairs Office, based at ESA Headquarters in Washington, DC, works closely with these experts to respond to media and policy requests and to proactively develop ecological resources for decision-makers. Recent examples of RRT activities include helping to develop the Society's position statement on biofuels sustainability, offering an all-day wetlands field trip for congressional staffers, preparing an amicus brief on wetlands to the US Supreme Court, briefing congressional staff on wildfires, and responding to media inquiries from *BBC Radio*, *Nature*, *Forbes*, and *Environmental Science & Tech Magazine*.

The Society recognizes that many key environmental decisions are made at the local and state levels. Because the national-level RRTS have worked so well, the Society now hopes to establish Regional Rapid Response Teams through the Society's regional chapters. These regional teams would be modeled after the federal-level ESA RRTs and would be coordinated through ESA's national office. The regional teams would function on a smaller scale, interacting with regional community leaders, government officials, and business leaders and responding to the most pressing issues facing a given region in the U.S., such as drought, fire, and land use change.

***The Future of Freshwater Wetlands in the Southeastern United States***

**Rebecca R. Sharitz**, Savannah River Ecology Laboratory, Aiken, GA

Nearly half of the wetlands in the conterminous United States are in the southeastern states. The landscape in this region has been altered dramatically

over the past 250 years, and freshwater wetlands have declined more rapidly than estuarine wetlands throughout most of the area. Numerous studies and reports have attributed declines in southeastern freshwater wetlands principally to activities associated with agriculture, forestry and urbanization. Annual net loss of freshwater wetlands in the U.S. has decreased in recent decades, from 177,900 ha yr<sup>-1</sup> in the 1950s-1970s, to 114,800 ha yr<sup>-1</sup> in the 1970s-1980s, to 23,300 ha yr<sup>-1</sup> from 1986-1997 (D. De Steven and R. Lowrance pers. com., based on data from U.S. Fish and Wildlife Service Reports). Although knowledge of the ecological functions and values of wetlands to our society, including protection of water resources, has increased vastly in recent decades, many decisions that affect the integrity of wetland ecosystems are made without appropriate application of this information.

The Southeast is one of the more rapidly-growing regions of the country in terms of population increases and urban development, and water is likely to become one of its most critical natural resources, as evidenced by recent severe shortages. In several areas, intrastate and interstate water disputes have arisen as population growth continues and demands for water increase. For example, conflicts between Georgia, Florida and Alabama in the Apalachicola-Chattahoochee-Flint River Basin center around conflicting demands for ecosystem services including metropolitan water needs, hydropower, groundwater withdrawal for agricultural irrigation, protection of threatened and endangered aquatic species, and maintenance of downstream estuarine productivity. Bottomland forest restoration efforts are declining in some areas. Since 2006, rising prices for corn, soybeans, wheat and other agricultural commodities have reduced the willingness of individual landowners to place marginal cropland on drained floodplains, such as in the lower Mississippi Alluvial Valley, into conservation programs that encourage wetland restoration. Geographically isolated which provide critical habitat to many amphibian species are no longer protected under the Clean Water Act as the result of a 2001 Supreme Court decision and additional recent rulings. Their protection, if any, now falls to state agencies.

Decisions affecting the future of wetland resources often are made in the private sector or by local governments. It is thus imperative that ecologists and wetland scientists work with community leaders and local government officials to bring the best available ecological knowledge into decision-making. The Edisto River Basin project, lead by the Water Resources Division of the South Carolina Department of Natural Resources in the 1990s, is an example of the way in which various stakeholders, including business leaders, governmental officials, and local citizens, can work effectively with environmental scientists to plan for future sustainability of regional resources. The establishment of the Southeast Regional Knowledge Partnership is an excellent approach to bringing science to bear on decision-making at multiple levels, from individual to community, to state-level.

### ***The Future of Southeastern Forests***

**Norman L. Christensen**, Nicholas School of the Environment, Duke University, Durham, NC

Prior to 1700, forests covered over 100 million hectares of the Southeast. Even then, their composition had been influenced by the activities of people, particularly fires set by Native Americans. In the 300+ years since then, the forest landscapes of the Southeast have witnessed enormous change. As European settlement began between 1600 and 1750, forests were gradually replaced by agricultural fields. Economic development and the expansion of market agriculture accelerated deforestation thereafter. By 1860, only 34 million hectares of forest remained, and most of that forest was vastly altered from pre-settlement conditions by high-grading, grazing and fire exclusion. By the Civil War, much of the agricultural land had been robbed of its topsoil and nutrient capital, and badly eroded.

Economic and ecological impoverishment produced widespread land abandonment after the Civil War and continuing to World War II. Former cropland was reforested by the familiar process of old-field succession producing a mosaic of even-aged pine stands. Degraded hardwood forests also underwent successional changes that have been less-well studied. By 1910, because of widespread reforestation (most of it natural), forest cover had increased to over 75 million hectares. It was this mosaic of successional forests that provided the basis for the development of the wood fiber industry in the Southeast.

Since 1910, southeastern forest cover has remained remarkably constant between 75 and 80 million hectares. However, the character of southeastern forests has changed considerably. There has been a 50% decline in the abundance of naturally seeded pine forests and a concomitant increase in the aerial extent of hardwoods and planted pine forests. There have been significant changes in forest ownership as well. Non-industrial private land ownerships have become increasingly fragmented. The majority of such ownerships are now less than 40 hectares. In the past decade, forest land ownership by integrated forest product companies has diminished from over 10 million hectares to less than 1 million hectares. There has been growth in federal, state and municipal land ownership, much of which is associated with lands dedicated to wildlife and water conservation. While overall their overall area has remained constant, development has produced significant declines in forest cover near urban areas. This has been offset by increased forest cover on some rural landscapes. Nevertheless, forests are being lost in places where the ecosystem services they provide are most needed.

Future southeastern forests will be shaped by continued succession, patterns of urban development, invasive native and non-native species, and changes in climate. Evolving (and possibly conflicting) interests in forests for biofuels and carbon storage will likely influence forest management in many places. The future of our forests depends on public understanding of the important ecosystem services they provide and consensus around integrated public policies for their stewardship and conservation.

***The Southern Forest Futures Project: Forecasting and sustainability***

**David N. Wear**, Southern Research Station, U.S.D.A. Forest Service, Asheville, NC

The US Forest Service, Southern Research Station and Southern Region, in partnership with the Southern Group of State Foresters, are launching the Southern Forest Futures Project. This effort builds on the Southern Forest Resource Assessment (2002) which identified several forces of change reshaping forests and the potential implications of these changes for economic conditions and ecological services. The Southern Forest Futures Project further examines how these and other emerging factors could reshape forests over the next half century and beyond. The SFFP will focus on forecasting future change and its potential implications for forest ecosystems, their services, and human communities. Completing the SFFP will require a combination of cooperative "visioning" to define possible future scenarios and interdisciplinary science to evaluate their implications.

Regional scale resource assessment in the South is especially challenging because of the broad diversity of ecological systems, economic conditions, and social settings involved. Much of the knowledge base relevant to forests is ecosystem-specific and social dynamics and resource problems are spatially variable. Furthermore, the various forces of change at work in southern forests are understood in varying degrees and with different levels of certainty. We have designed a three tier analysis approach to address the simultaneous needs for a coherent regional outlook on forest futures and a detailed analysis of ecological, economic, and social effects. One tier focuses on forecasting forces of change and their implications for ecosystem structure and services for the entire region but at a fairly fine grain. A second tier will evaluate broad "meta-issues" defined as broad questions that warrant a careful science-synthesis approach. The third tier will focus on interpreting the results of the forecasting and meta-issue analysis for specific implications in five sub-regions of the South.

In order to ensure public relevance and application of the best science, the SFFP will engage communities of interest in natural resources including research, management, and nongovernmental organizations throughout the project. Teams of scientists and analysts will construct forecasts for the region and conduct research and utilize existing knowledge to evaluate ecosystem and community implications of forecasts. Extensive peer review will be employed to ensure that the SFFP represents the best available science and builds the best possible understanding of the potential future for southern forests. What's more we envision the results of this assessment building on our previous Assessment to supply scientists and analysts with a foundation of data and synthesis in support of ongoing regional analysis.

***Discussion/Synthesis***

Ecology is frequently ignored in project planning and implementation because project planners and other stakeholders lack the time and resources to rapidly assimilate, interpret and apply currently available data and knowledge. One of ESA's greatest challenges is to develop effective "knowledge partnerships" with decision makers in government and business. Through these

partnerships, we can share the basic principles of ecology and clarify how they can help shape solutions to some of society's most vexing problems and promote sustainability. The Southeast Regional Knowledge Partnership will seek to bring scientists, policy makers, business and community leaders together to address the particular environmental issues confronting the states of Alabama, Louisiana, Mississippi, Florida, North and South Carolina, Tennessee, Virginia and West Virginia.

The vast majority of decisions that affect the environment are made in the private sector and on the local governmental level. Whether the decision maker is a factory supervisor or a county elected official, it is critical that they seek, obtain and use the best available ecological knowledge. The effective addressing of complex environmental problems requires access to accurate and up-to-date scientific information.

Conversely, ecologists who want to affect decision making about the environment must understand the needs of decision makers and how to make ecological knowledge available in a form that is both accessible and useful. One way of accomplishing this is to effect collaboration among community leaders, government officials, business leaders and environmental scientists. These four sectors are the target audience for the Southeast Regional Knowledge Partnership.

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Students enjoy the view of the Choccolocco Mountains from the Houston Cole Library, Jacksonville State University, Jacksonville, Alabama.

## **ASB COMMITTEES 2008-2009**

### **Revised October, 2008**

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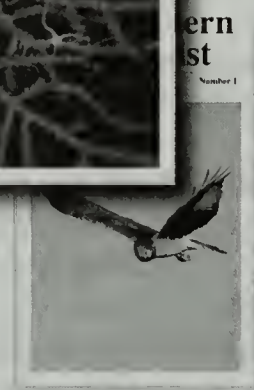
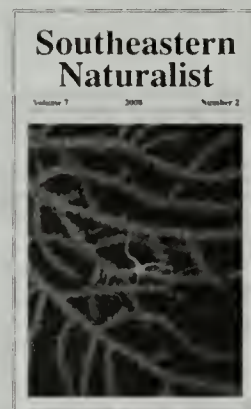
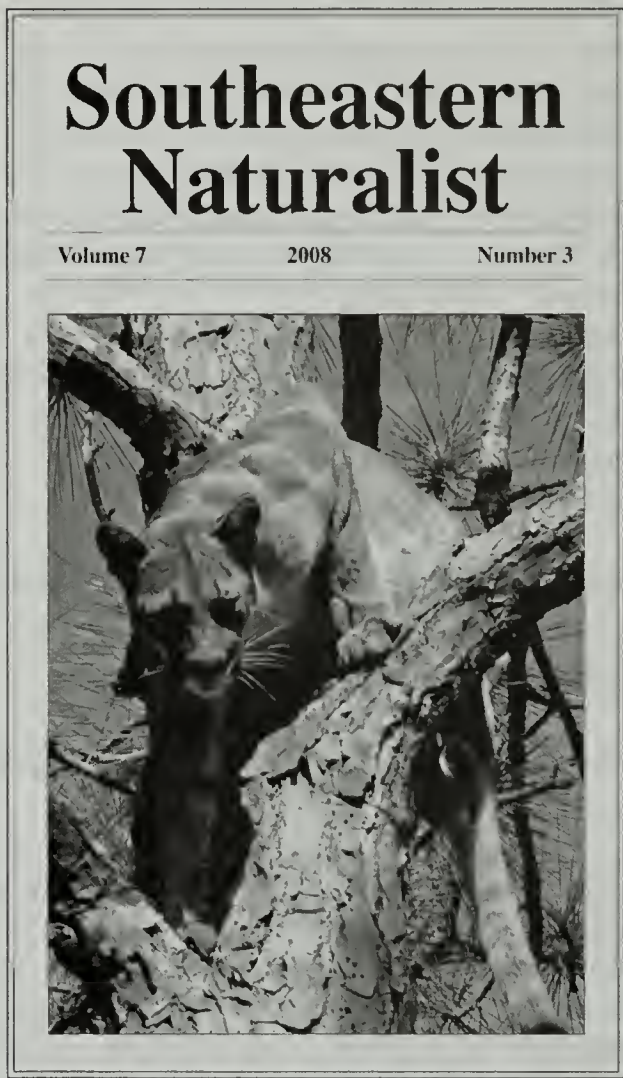
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# Southeastern Naturalist

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## NEWS OF BIOLOGY IN THE SOUTHEAST

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## ABOUT PEOPLE AND PLACES

### TENNESSEE

At the meeting of the Natural Areas Association, 14-17 October 2008, in Nashville, Tennessee, **Dr. Elsie Quartermann**, formerly of Vanderbilt University, and **Dr. Hal De Selm**, formerly of the University of Tennessee, Knoxville, were each given the George B. Fell Award. The honors were "In recognition of exceptional career-long achievements in the Natural Areas Profession." The Awards dinner was held in the Ryman Auditorium.

#### George B. Fell Award

The Natural Areas Association (NAA) awards the George B. Fell Award to an individual who exhibits the highest qualities of the natural areas profession and who has significantly advanced natural area identification, protection, stewardship or research. This award is given in honor of George B. Fell, founder of the Natural Land Institute and a founding NAA member and officer who dedicated his life to the protection of Natural Areas. This is NAA's highest award, and it is reserved for exceptional achievements in any of the areas in which the NAA is concerned. It is a top-of-career award. The award:

1. Recognizes those qualities exhibited by George B. Fell such as lifelong dedication and commitment, creativity, and the ability to forge new approaches that significantly advance natural area protection.
2. Recognizes sustained or ongoing individual achievement in the natural area profession.
3. Recognizes accomplishments that have significantly advanced natural area identification, protection, stewardship or research.
4. Recognizes any area of profession activity.
5. Maintains a very high standard of integrity for the award.

## Dr. Elsie Quarterman

George B. Fell Awardee

Dr. Elsie Quarterman is a distinguished conservation biologist who has spent much of her life discovering and teaching about the ecology of the globally rare Middle Tennessee cedar glades. Dr. Quarterman did some of her earliest investigation as early as the late 1940s in such areas as Cedars of Lebanon State Forest. She was an early advocate for protecting Cedars of Lebanon State Forest that resulted in designation in 1973 of over 1,000 acres of the Forest as a state natural area. More recently, her influence and work on cedar glade ecology was recognized by the State when Elsie Quarterman Cedar Glade State Natural Area was designated in 1998.

Dr. Elsie Quarterman was a member of the faculty in the College of Arts and Science of Vanderbilt University for 33 years. Her career at Vanderbilt was distinguished and she retired in 1976 as Professor of Biology, Emeritus. She began her career at Vanderbilt in 1943 coming from Duke University. Dr. Quarterman was a dedicated teacher; who influenced many former undergraduate students to have a greater appreciation of the botanical and ecological worlds in which they live. Many of her graduate students went on to establish their own teaching and research careers at many other institutions of higher education thereby amplifying Elsie's educational legacy.

As a world authority on the ecology of cedar glade communities, she was responsible for discovering the occurrence of a number of rare and endangered Cedar Glade endemic plants including the federally endangered Tennessee coneflower, (*Echinacea tennesseensis*). Her work ultimately led to the protection of many Middle Tennessee cedar glades as state natural areas. Dr. Quarterman also played a prominent role in the preservation of Radnor Lake in 1973. Dr. Quarterman recognized the value of state natural areas as important living laboratories and taught some field ecology classes at Radnor Lake where she conducted research activities. Dr. Quarterman was also involved in a National Park Service inventory during the late 1970's and was responsible for proposing many of the National Natural Landmarks Designations, 14 of which are recognized by the National Park Service in Tennessee.

Dr. Quarterman has remained involved and active in a wide variety of organizations that focus on plant conservation. Presently, Dr. Quarterman serves as a member of the Tennessee Natural Areas Advisory Areas Committee. This committee reviews and nominates new state natural areas to the Commissioner of the Department of Environment and Conservation for designation. Dr. Quarterman continues to work hard to preserve the natural heritage of our state. She has created a conservation legacy in Tennessee that is unsurpassed by any living individual and because of her lifetime commitment to conservation, should be recognized for these lifetime accomplishments.

**Dr. Hal De Selm**

George B. Fell Awardee

Dr. Hal De Selm is a distinguished conservation biologist who has spent much of his life discovering and teaching about the ecology of natural ecosystems. It is because of his fieldwork encompassing decades of work that many of these intact ecosystems that he discovered, including rare cedar glades and barrens (prairies) and their associated rare plant species, are today protected as conservation lands. His contributions in locating these sites have also helped the State and other conservation organizations prioritize targets for future conservation efforts.

In addition, it is through his dedication and work that ecologists have come to recognize the overall importance of grassland ecosystems in Tennessee and the Southeast. It is because of his research and scholarship that there is now a much greater understanding that Tennessee was not always a vast forest but also had significant expanses of glades and barrens across its landscape that we now recognize as critical natural areas that should be protected.

Dr. De Selm was born 1924. He served in the U.S Marine Corps from 1943 – 1946 and then returned to college at Ohio State University where he received his B.Sc., M.Sc, and then his Ph.D. in 1953. Dr. De Selm has distinguished himself as an esteemed professor of botany and ecology at the University of Tennessee at Knoxville. He has been a member of 21 scientific societies and president of the Southern Appalachian Botanical Society and Vice President of the Lucy Braun Association and has served as section president, committee chairs and board members of several. He was plant ecology editor for two national journals. He directed many graduate students, some of whom made significant contributions in natural areas study, preservation, research and administration. He has authored or co-authored over one hundred journal papers or reviews, papers in proceedings, book chapters and reports of which 16 were of significant length.

He has served on advisory committees for the U.S. Forest Service, Tennessee Department of Environment and Conservation and the University of Tennessee Institute of Agriculture. He has made studies of natural areas vegetation structure, floristics, especially of grasses, effects of fire on vegetation, remote sensing, and terrestrial ecosystem processes. During the course of a dedicated lifetime, Dr. Hal De Selm's contributions to conservation in Tennessee are immeasurable. Even in retirement, Dr. De Selm continues to examine natural areas the study of which contributes to the conservation of Tennessee's most unique and rare landscapes.

He has examined nearly 4000 natural area sites, some were with a public or business fund source. Some of these examinations were in the National Park Service National Natural Landmarks search programs in the Appalachian Ranges and Appalachian Plateaus areas. Most of these studies, however, are in the past decade and a half for his study of the Natural Terrestrial Vegetation of Tennessee, a study begun in 1993 and which continues.

### Carl D. Becker Stewardship Award

The Carl D. Becker Stewardship Award was presented to **Gary Milano** by Kim Herman.



Elsie Quarterman (left) and Hal De Selm (right) with bronze statues of country stars Minnie Pearl (right) and Roy Acuff.



From left to right: Brian Bower, Hal De Selm, Elsie Quarterman, Gary Milano, and Kim Herman.



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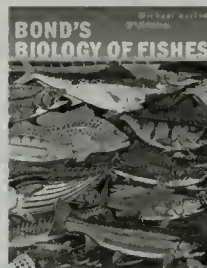


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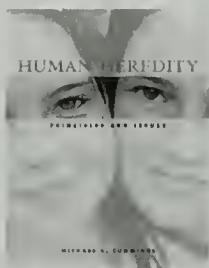


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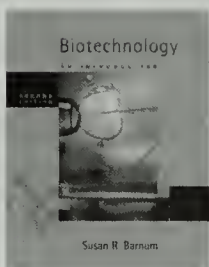
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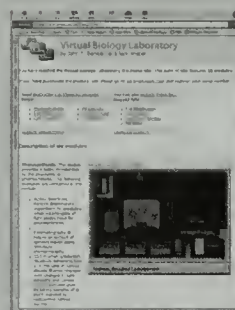


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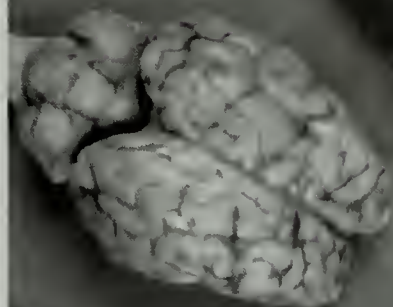
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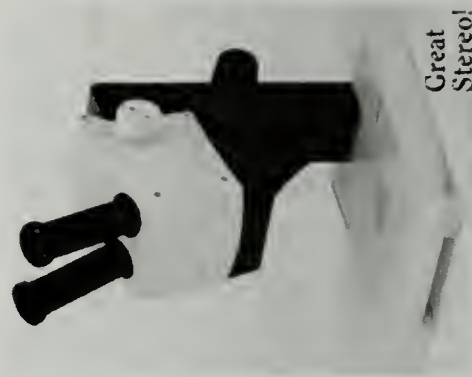
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